DOCUMENT RESUME

ED 246 192 CE 039 152

TITLE	Project on Teaching Charts and Graphs to ABE Students. Part I: Teacher's Guide [and] Part II: Transparency Assembly Package.
INSTITUTION	Renton Vocational Inst., Wash.
SPONS AGENCY	Washington State Office of the State Superintendent of Public Instruction, Olympia. Div. of Adult Education and Community Schools.
REPORT NO	VE/201/84; VE/202/84
PUB DATE	83
NOTE	143p.
PUB TYPE	Guides - Classroom Use - Guides (For Teachers) (052) -- Audiovisual Materials (100)
EDRS PRICE	MF01/PC04 Plus Postage.
DESCRIPTORS	*Adult Basic Education; *Charts; *Classroom Techniques; Competency Based Education; *Content Area Reading; *Functional Reading; *Graphs; Guidelines; Instructional Materials; Lesson Plans; Mathematics Skills; Reading Skills; Vocabulary; Vocabulary Development

ABSTRACT

The teacher's guide and collection of transparency masters are designed for use in teaching adult basic education (ABE) students how to read and interpret graphs and charts. Covered in the individual lessons of the instructional unit are the reading and interpretation of charts as well as picture, line, bar, and circle graphs. Each unit contains a detailed lesson plan that includes instructions for presenting the vocabulary and mathematical concepts addressed in three separate graphs or charts, a student worksheet along with instructions for its presentation, and an answer key for the worksheet. Throughout the instructional unit, graphs and charts are presented that deal with such relevant topics as taxes, alcohol intake, jobs, earnings, population growth, government spending, clothing sizes, and comparison shopping for computers and checking accounts. The transparency masters include a series of picture, bar, line, and circle graphs and charts dealing with such topics as the number of farms in the United States, the effects of alcohol on the body, tax exemptions, oil consumption, jobs in Washington State, the distribution of earnings in the United States, monthly rainfall, the prison population, household income, government income, government spending, sizes of sweat pants, a comparison of computers, and budget deficits. A brief discussion of procedures for displaying transparency masters and suggestions for presenting these particular transparency masters are provided. (MN)

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ED246192

PROJECT ON TEACHING CHARTS AND GRAPHS TO ABE STUDENTS

PART I
TEACHER'S GUIDE

1983

CE039152

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PROJECT ON TEACHING CHARTS AND GRAPHS TO ABE STUDENTS

PART I TEACHER'S GUIDE

This publication was the product of and partially funded by Federal funds distributed by the Office of the State Superintendent of Public Instruction, Olympia, Washington 98504.

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SPECIAL EXPERIMENTAL DEMONSTRATION PROJECT -- ADULT EDUCATION

Public Law 91-230, As Amended Through November 1, 1978
Section 310 (1) (A) and (B)

FISCAL YEAR 1983

A PROJECT TO TEACH THE CONCEPTS OF CHARTS AND GRAPHS TO ADULT BASIC EDUCATION STUDENTS

RENTON VOCATIONAL TECHNICAL INSTITUTE
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July 1, 1982 - July 15, 1983

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Dr. Robert C. Roberts Date

This project meets priorities 4, 5, 6, and 8, in that it develops a set of competency-based instructional materials, guidelines for their use, and instructional aids for teachers. Content of the project assists in the improvement of instructional practices in adult education targeted at the improvement of basic reading and comprehension skills needed to function effectively in the adult environment.

READING CHARTS AND GRAPHS

A Classroom Instructional Unit of Five Lessons

(to be used with accompanying set of overhead transparencies)

I. Unit Overview
   - A. Purpose
   - B. Objectives
   - C. Unit Outline
   - D. Lesson Plan
   - E. Evaluation

II. Lesson One - Picture Graphs
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   - B. Graph 2 - Alcohol's Effect on the Body
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   - D. Worksheet - Auto Imports
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III. Lesson Two - Bar Graphs
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   - E. Answer Key to Worksheet

VI. Lesson Five - Charts
   - A. Chart 1 - Sweat Pant Sizes
   - B. Chart 2 - Comparison of Microcomputers
   - C. Chart 3 - Deficit Spending
   - D. Worksheet - Checking Account Comparison
   - E. Answer Key to Worksheet

READING CHARTS AND GRAPHS

UNIT OVERVIEW

Purpose: This unit is designed to improve the ability of students in an Adult Basic Education program to read and interpret various charts and graphs.

Objectives: In each lesson, students will read three sample charts or graphs. With instructor guidance, they will discuss the graphs and respond to questions about those graphs. In addition, students will read without assistance one chart or graph in each lesson and will answer questions about it with 80% accuracy.

Unit Outline: Five lessons are given, each based on a specific type of chart or graph. Each lesson contains: 1) Three overhead transparencies, 2) A Teacher's Guide for each transparency, 3) A student worksheet to be copied for class distribution, and 4) Worksheet answer key.

I. Picture Graphs
II. Bar Graphs
III. Line Graphs
IV. Circle Graphs
V. Charts

Lesson Plan: Each lesson is designed for presentation to a group of students. Approximate time needed is 55 minutes if the worksheet is used as homework, or 90 minutes if the worksheet is to be done in class.

The lesson plan for each lesson is the same:

1. Present and discuss graph 1. (15 min.)
2. Present and discuss graph 2. (15 min.)
3. Present and discuss graph 3. (15 min.)
4. Distribute and explain worksheets. (10 min.)
5. Worksheets may be done in class (30 min.) or as homework.

Evaluation: An attempt should be made during class discussion to discern whether or not students understand the techniques to be used for reading each graph. This may be done either through individual questioning or through observation. If individual evaluation in the form of grades is desired, that could be based on a percentage scoring of the worksheets. To show mastery, a student should score at least 80%.

Introduction to Lesson One

READING PICTURE GRAPHS

Background Information for Teachers:

A picture graph gives information in the form of small picture symbols. Each of these symbols will represent a given number, and that value will be stated specifically somewhere on the graph. Emphasize to students that knowing the value of the symbols used is essential to reading the graph correctly.

A necessary skill in reading a picture graph is interpreting symbols which are only a portion of the whole. Usually distinctions of this sort are made only by halves, or at the most thirds or fourths. Readers of picture graphs must make an estimate as to what part of the whole is being shown. Because it is difficult to make fine distinctions, information derived from a picture graph is necessarily only approximate.

The steps in reading a picture graph are:

1. Read the title and the axis headings.
2. Look for the key to the symbol(s) used.
3. Look for general increasing or decreasing trends.
4. Find more specific details, realizing that the numbers given are only approximate.

Caution students against becoming too involved in the information given in any of the graphs or charts in this unit. While they are interesting and students may agree or disagree with the information presented, it is not the most important point of these lessons. The primary goal is to learn to read those charts and graphs which they may encounter in life or in textbooks or on tests.

Graphs given in this lesson include:

Graph 1 - Number of Farms

Graph 2 - Alcohol's Effect on the Body

Graph 3 - Tax Exemptions

Worksheet - Auto Imports

Each of these graphs is on a transparency which should be shown to the class on an overhead projector. A separate Teacher's Guide for each transparency follows the lesson introduction.

Teacher's Guide

PICTURE GRAPH 1 -- NUMBER OF FARMS

Words to Learn: trend

I. Open the overlays to show only the title, the axis, and the key.

   A. What is the general subject of this graph? (number of farms)

   B. Will it tell how many farms there are this year? (No, it shows information for every decade 1900-1980)

   C. What does the symbol at the bottom of the chart indicate? (That symbol represents one million farms.)

II. Fold down the first overlay with the symbols.

   A. Notice that for each year there is a different number of symbols. What does this show? (There was a different number of farms which existed in each year.)

   B. What general statement can be made about the number of farms since 1910? (It has consistently decreased.)

   C. What does the partial symbol shown for some years indicate? (some part of a million farms)

   D. How many farms were there in 1960? (four million)

   E. How many were there in 1910? (about 6½ million)

   F. What was the decrease in the number of farms between 1910 and 1950? (about one million)

   G. What was the percent of decrease in the number of farms between 1960 and 1970? (25% -- 1 out of 4)

III. Fold down the second overlay with the questions. Give the students time to answer the questions individually or in groups, and then discuss the answers.

   1. The greatest decrease in the number of farms occurred between which years? (1950 and 1960)
      The greatest increase? (1900 - 1910 was the <u>only</u> increase)

   2. There has been a decreasing trend in the number of farms for how many years? (60 years -- since 1920)

   3. The number of farms has decreased by how many from 1920 to 1980? (four million)

   4. The number of farms in 1970 was about what percent of the year with the greatest number of farms? (about 45%; 3 million in 1970 is about 45% of 6.7 million in 1920. Figures can be only approximate.)

Teacher's Guide

PICTURE GRAPH 2 -- HOW ALCOHOL AFFECTS THE BODY

Words to Learn: content, judgement, impaired, legal, intoxication.

I. Open the overlays to show only the title and the axes.

A. What does the title tell you that this chart is going to show? (the effect of alcohol on the body)

B. Look at the left (vertical) axis. What do those numbers represent? (the weight of a person, given in pounds)

C. What does the small symbol of a whiskey jug stand for? (one ounce of alcohol in the blood)

II. Fold down the first overlay, showing .01 - .04 blood alcohol content.

A. What do these symbols show? (the number of ounces of alcohol in the bloodstream which will impair judgement)

B. At what point is a person's judgement impaired by alcohol content in the blood? (According to the graph, any amount at all impairs judgement.)

C. How many ounces could a 160-pound person have in his or her bloodstream before reaching the upper level of judgement impairment, or .04? (two ounces)

D. What about a 100-pound person? (about 1 1/3 ounces)

E. What general statement could be made about weight and blood alcohol content? (As weight goes up, the amount of alcohol in the blood necessary to cause impaired judgement goes up slightly.)

III. Fold down the second overlay, showing .05 - .09 blood-alcohol content.

A. What is the difference between these symbols and the ones given first? (These indicate blood-alcohol levels which constitute legal intoxication, not just impaired judgement.)

B. What point on the graph would show approximately a .05 blood-alcohol level? (The point at which the color of the symbols changes)

C. The end of a row of symbols indicates approximately what blood-alcohol level? (.09)

D. Is this the legal intoxication level in all states? (No, only in some. A level of .10 means intoxication in all states.)

E. How many ounces of alcohol in the bloodstream of a 100-pound person would result in a blood-alcohol level of approximately .09? (three)

F. How many ounces of alcohol in the bloodstream of a 200-pound person would result in legal intoxication? (six ounces if the limit is .09 -- only slightly more if the limit is .10)

IV. Fold down the third overlay containing the questions.

1. If a 12-ounce can of beer adds one ounce of alcohol to the blood, how many beers could a 200-pound person consume before he was legally intoxicated? (six)

2. If every 5 ounces of wine adds one ounce of alcohol to the blood, a 160-pound person could drink how many ounces before reaching the .05 level? (ten ounces)

3. A 180-pound person would have to consume how many ounces of alcohol to reach .09 blood-alcohol content? (5½ oz. in blood -- depends on type of liquor)

4. If a state's legal intoxication level is .10, a 220-pound person could consume how many more ounces of beer than a 120-pound person and remain under the legal intoxication level? (3 x 12 = 36 oz. more beer, resulting in 3 oz. more alcohol in the blood)

Teacher's Guide

PICTURE GRAPH 3 -- TAX EXEMPTIONS FOR MARRIED COUPLES

Words to Learn: exemptions, continued

I. Open the overlays to show only the title, the axis, and the key.

A. Does this graph show tax exemptions for a family of four? (No, it shows exemptions for couples.)

B. What does the vertical axis show about how that information will be given? (It shows that it will be given by different years.)

C. Look at the key at the bottom of the graph. What does it tell you? (that something is equal to $500)

II. Fold down the overlay with the symbols.

A. What are these pictures? (bundles of money)

B. What do they represent? (Each one represents $500 in tax exemptions.)

C. Is there any one trend toward increasing or decreasing over the past seventy years? (No, it decreases and increases and decreases and then increases again.)

D. What was the tax exemption for a married couple in 1983? (4 x $500 = $2000)

E. How much did the tax exemption decrease between 1940 and 1941? ($500)

F. When the exemption increased from $2000 to $2500 in 1921, what was the percent of that increase? (25%)

G. How would an increase in tax exemptions affect the amount of tax paid by a married couple? (It would lower their taxes because more of their income is exempt.)

III. Fold down the second overlay with the questions.

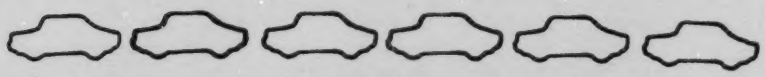
1. The current trend toward higher tax exemptions has continued for how many years? (1944 to 1983 = 39 years)

2. The amount of the tax exemptions for 1925-31 was how much greater than the tax exemption for 1970? ($3500 - $1250 = $2250)

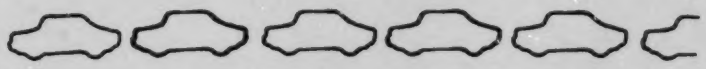
3. In 1983, the amount of the tax exemption was what percent greater than the amount for 1945? (200%)

Worksheet on Picture Graphs

Maeshiro Corporation Auto Imports

1979 

1980

1981 

1982

= 100,000 cars

1. What years are represented by this graph?

2. What amount does each car stand for?

3. In which year did Maeshiro Corporation import the most cars? the fewest?

4. How many cars did they import in 1979?

5. Is there an increasing or a decreasing trend in the number of imports?

6. What were the total imports for 1979-1982?

7. What percent of the total imports were the 1982 imports?

8. How many more cars were imported in 1982 than in 1981?

Worksheet on Picture Graphs -- Answer Key

1. 1979-1982
2. 100,000 cars
3. 1982 had the most exports; 1980 had the fewest.
4. 600,000
5. an increasing trend
6. 2,350,000
7. 30% [700,000 ÷ 2,350,000]
8. 250,000

Introduction to Lesson Two

READING BAR GRAPHS

Background Information for Teachers:

Bar graphs are used to show comparisons between quantities. Each quantity is shown by a broad line, called a bar, which may run either horizontally or vertically. These bars are placed on a graph with a horizontal and a vertical axis. Each axis contains some information. One of the axes will label the different items and the other will give the numbers which measure the items.

Once students are able to read the information on a bar graph, they need to consider the uses of that information. They should realize that the numbers given cannot be very exact; this type of graph is more useful for comparison than for obtaining specific numerical information.

After students are able to make some general comparisons of quantities, they may be able to go on to find amounts of increase, decrease, or differences between quantities. It is necessary to re-emphasize, however, that quantities are usually approximate rather than exact.

The steps in reading a bar graph are:

1. Read the title and labels on the axes.
2. Ask, "What information is being compared in this graph?"
3. Look for general increasing or decreasing trends.
4. Find more specific details, realizing that the numbers given are only approximate.
5. Make some comparisons between items on the graph.
6. Combine the information in some new way, such as finding differences or percentages.

Graphs given in this lesson include:

Graph 1 - Free World Oil Consumption

Graph 2 - Jobs in Washington State

Graph 3 - Earnings Distribution, 1980

Worksheet - Ristorante Giovanni Profits

Each of these graphs is on a transparency which should be shown to the class on an overhead projector. A separate Teacher's Guide for each transparency follows the lesson introduction.

Teacher's Guide

BAR GRAPH 1 -- FREE WORLD OIL CONSUMPTION

Words to Learn: consumption

I. Open the overlays so that only the title and axes of the graph are shown.

   A. Point out the title. What information do students expect to gain from the graph? (how much oil is used in the non-communist world)

   B. Point out the vertical axis -- "Millions of barrels per day" -- and ask the students to be more specific about the information they will gain. (the amount of oil consumed will be given in millions of barrels per day)

   C. Point out the horizontal axis. What do the numbers there probably represent? (years) How, then, will the information about oil use per day be given? (by separate years)

      At this point, you may ask for discussion about oil use -- would the students <u>expect</u> that it has increased or decreased?

II. Fold down the first overlay with the bars given. Give the students a brief opportunity to study the completed graph.

   A. Point out the pattern of decrease followed by increase, followed again by decrease. Mention that this general information can be found quickly without careful study. Discuss whether or not this pattern was what they had expected.

   B. Use a straightedge to compare the top of each column with the right-hand vertical axis. Ask students to tell how many millions of barrels per day were used in each of several different years. For example, how much was used in 1977? (50 million)

   C. Compare consumption from two specific years by finding amounts for each year and then subtracting. Students will need to think carefully about whether the difference represents an increase or a decrease. For example, what is the difference between 1973 and 1975? (a decrease of 1½ or 2 million barrels)

III. Fold down the second overlay with the questions on it. Divide the students into small groups to find the answers to the questions, then re-assemble and discuss them as a class.

1. In what years was the trend in oil consumption
   increasing? (76, 77, 78, 79)
   decreasing? (74, 75, 80, 81, 82)
2. In what year was the most oil consumed? (79)
3. What two years had about the same consumption?
   (There are two possible answers -- '77 and '80 or '73 and '81)
4. What is the percent of decrease in consumption
   from 1979-1982? (about 16-17%, but numbers are approximate)

Teacher's Guide

BAR GRAPH 2 -- JOBS IN WASHINGTON STATE

Words to Learn: corrections, foresters, machinists, computer, specialist, occupation

I. Open the overlays so that only the title and axes of the graph are shown.

   A. Point out the title and ask what information will be given on the graph. (information related to employment in the state of Washington)

   B. Point out the vertical axis and discuss briefly each job title, perhaps specilating on whether it will be an important job in the future or not.

   C. Point out the horizontal axis and ask what the numbers given there probably represent. (numbers of jobs, in the thousands -- such as 2,000 or 4,000)

II. Fold down the first overlay with "Total number jobs filled in 1982."

   A. Ask a specific student to identify what information has now been added to the graph. (how many jobs in each category were filled in Washington state in 1982)

   B. Ask one or two other students to give the number of jobs filled in a specific category in that year. For example, how many computer specialist jobs were filled? (7,130,000)

III. Fold down the second overlay with "Total number jobs available in 1987."

   A. Show that we now have two numbers given for each year. What does each of the different numbers represent? (jobs in 1982 and jobs expected in 1987)

   B. How many computer specialist jobs are expected i n 1987? (8,540,000)
   How many nursing jobs? (26,150,000)

   C. Point out that we can now compare information in each job title to see whether the demand for that type of worker will increase or decrease. Go down the list of jobs and ask the class whether the number of jobs in each category will increase or decrease.

   D. This particular graph gives more specific information than many bar graphs because specific numbers are given as well as bars representing the numbers. Figure specifically how many more

D. (continued) secretarial jobs there will be in 1987 than there were in 1982. (4,350,000 -- remind students that numbers given are in thousands)

IV. Fold down the third overlay containing the questions. Have the students find the answers in small groups and then ask each group to report back to the class.

1. The occupation area expected to gain the largest number of new employees by 1987 is (nurses -- 4,670,000 Students can estimate those which have largest gains and then subtract to find whether secretaries or nurses will have the largest gain.)

2. How many more computer specialist jobs should be available in 1987 than in 1982? (1,410,000 -- remind them that numbers given are in thousands)

3. Which three jobs show the highest percent of growth? (machinists = 25%, waiters = 22%, nurses = 22%)

Teacher's Guide

BAR GRAPH 3 -- EARNINGS DISTRIBUTION, 1980

Words to Learn: distribution, census, annually, category

I. Open the overlays to show only the graph title and axes.

A. Point out the title and ask students to explain what information will be given in the graph. (how income was distributed in 1980)

B. Point out the horizontal axis with the earnings amounts and ask a student to explain what the numbers probably represent. (annual income)

C. Point out the vertical axis (distribution percent) and ask another student to explain what it represents. (percent of the population with a given income)

D. At this point in the lesson, you may ask students to guess where the largest part of the population would fall in terms of income. Would they expect many people to earn less than $3000? $50,000 and over?

II. Fold down the first overlay indicating earnings for women.

A. Ask a student to indicate how we know that this information relates to the earnings of women only. (key in upper right hand corner)

B. Ask the students to generalize about what income most women have. (The pattern is low at both extremes and is concentrated in the ranges including $7000 to $19,999.)

C. Use a straightedge to compare the top of each column with the left vertical axis. Ask individual students to tell what percent of women fall into each of several different income brackets.

(Given below are the specific percents:

Less than $3000	2.5%
$3000 to $4999	3.1%
$5000 to $6999	9.2%
$7000 to $9999	24.1%
$10,000 to $14,999	35.4%
$15,000 to $19,999	16.1%
$20,000 to $24,999	6.2%
$25,000 to $49,999	3.2%
$50,000 and over	0.2%

III. Fold down the second overlay indicating earnings for men.

A. Ask the students to study the information for a moment or two, then tell what new information is given and what pattern it shows. (This information gives earnings for men. The pattern is low at the lower incomes and higher at the upper end.)

B. Use a straightedge to compare the top of each column with the left vertical axis. Ask individual students to tell what percent of men fall into each of several different income brackets.

Given below are the specific percents:

Less than $3000	2.2%
$3000 to $4999	1.4%
$5000 to $6999	3.1%
$7000 to $9999	7.8%
$10,000 to $14,999	20.0%
$15,000 to $19,999	20.5%
$20,000 to $24,999	18.0%
$25,000 to $49,999	23.3%
$50,000 and over	3.7%

C. Compare statistics for men and women in several different income brackets. As an example: What percent of women make $10,000-$14,999? (35.4%) What percent of men make that amount? (20.0%)

D. Interpret the comparison. Do men or women make more money in general? (Men do, as shown by the bars which show that a much greater percentage of men are in the upper income brackets.)

E. Depending upon the level of the class, it may be interesting to discuss the effect of the division of income brackets. For example, the $25,000 - $49,999 bracket is a wide range and that probably affects the number of persons included in the bracket.

IV. Fold down the third overlay containing the questions.

1. What total percent of women earn $14,999 or less? (74%, approximately)

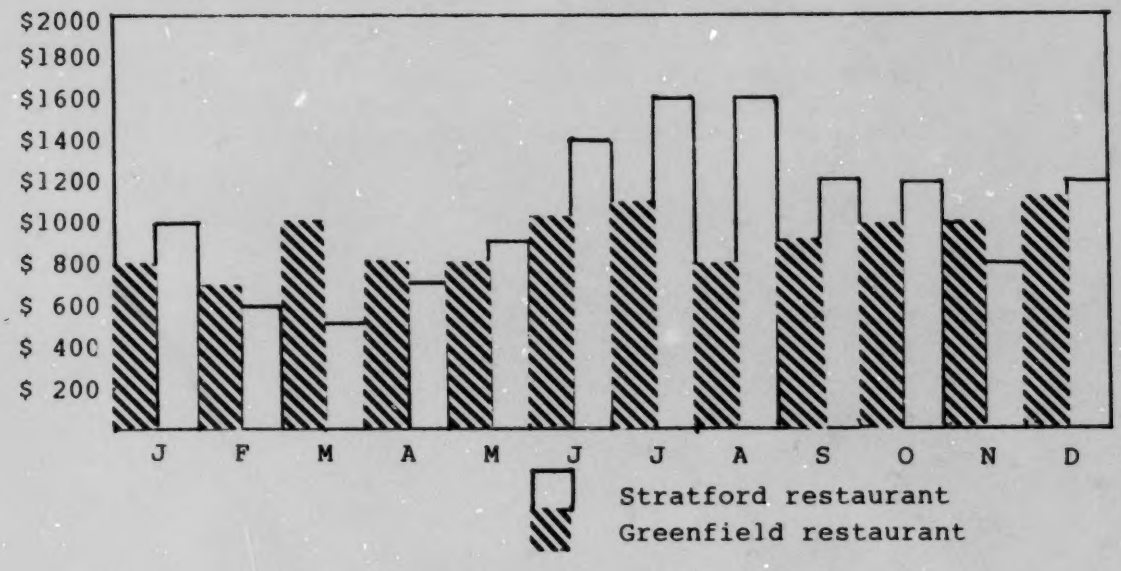
2. What percent of men earn $20,000 or more annually? (about 45%)

3. The greatest percentage difference for female earnings is between which two categories? (between $10,000 - $14,999 and $50,000 and over)

4. Compare the percent of men earning under $10,000 to the percent of men earning over $25,000. Make the comparison for women.
(27% of men earn over $25,000 and 14.5% earn under $10,000
3.4% of women earn over $25,000 and 38.9% earn under $10,000)

Worksheet on Bar Graphs

RISTORANTE GIOVANNI PROFITS 1982



1. What do the letters J F M A M J J A S O N D represent?
2. In which season does the Stratford restaurant make the most profit?
3. Which restaurant made the largest profit in January?
4. What was the profit for the Greenfield restaurant in May?
5. What was the May profit for Stratford?
6. Which restaurant has the greater changes in profit?
7. What was the annual profit for the Greenfield restaurant in 1982?
8. What were the total annual profits for both restaurants?
9. Which restaurant had the higher profits in 1982?
10. How much more did that restaurant make?
11. What was the percent of decrease for the Stratford restaurant from January to February?

Worksheet on Bar Graphs -- Answer Key

1. months of the year
2. summer
3. Stratford
4. $800
5. $900
6. Stratford
7. $11,000
8. $23,700
9. Stratford
10. $1700
11. 40%

Introduction to Lesson Three

READING LINE GRAPHS

Background Information for Teachers:

Like a bar graph, a line graph has a vertical and a horizontal axis, each with a set of information. A line graph does not show comparisons as clearly as a bar graph, however. Instead, it shows highs, lows, and trends toward increase or decrease. The main difference between line graphs and bar graphs is that the points on a line graph are connected by a line rather than being indicated only by a solid bar. Line graphs are most often used to indicate increases or decreases over a period of time.

Some line graphs have more than one line, or overlapping lines. This makes it possible to compare more than one trend, such as birth rate and death rate. The lines should be read separately in the same way that a single line graph is read, except that the lines will look different so that they can be distinguished from each other. There will also be a legend to explain what each line represents.

The steps in reading a line graph are:

1. Read the title and headings of the axes.
2. Be sure you understand completely what is being illustrated or compared.
3. Interpret the information being given. Does it show an increase? a decrease?
4. If there is more than one line, look for a key to explain what each line represents.
5. Compare the information given in each line and make a generalization about what it shows.
6. Look for specific details, realizing that it may be more exact than a bar graph but may still not be precise.

Graphs given in this lesson include:

Graph 1 - Average Monthly Rainfall

Graph 2 - Prison Population Growth

Graph 3 - Household Income

Worksheet - Infant Growth

Each of these graphs is on a transparency which should be shown to the class on an overhead projector. A separate Teacher's Guide for each transparency follows the lesson introduction.

Teacher's Guide

LINE GRAPH 1 -- AVERAGE MONTHLY RAINFALL

Words to Learn: average

I. Open the overlays to show only the graph title and axes.

   A. What information can be gained from the title? (The graph will show how much rain falls, on the average, in Seattle.)

   B. What information can be gained from the vertical axis? (the amount of rain will be measured in inches)

   C. What information can be gained from the horizontal axis? (the amount of rain will be given for each month of the year)

II. Fold down the first overlay with the line indicating rainfall.

   A. What is the pattern of rain in Seattle? (There is more rain in the winter and less in the summer, with roughly equal amounts in the spring and fall.)

   B. How much rain falls in an average February? (4 inches)

   C. Does March or October usually have more rain? (October)

III. Fold down the second overlay with the questions.

   1. Which two months have the same average rainfall? (February and October)

   2. What is the total annual rainfall? (38.7 inches, although students may not be able to be quite that exact)

   3. What is the average monthly rainfall? (about 3 inches. Students may not know the method for finding an average. Find the total and divide by the number of months.)

   4. The rainfall in March is about what percent of the annual rainfall? (about 10%)

IV. Fold down the third overlay with the actual numbers for monthly rainfall. Point out the correlation between the numbers and points on the graph. You may also wish to ask students to recompute their answers to the questions above.

Teacher's Guide

LINE GRAPH 2 -- PRISON POPULATION GROWTH IN WASHINGTON

Words to Learn: population, previous, projected, capacity, sentencing

I. Open the overlays to show only the title and axes of the graph.

   A. Pointing to the title of the graph, ask for the information which will be given in the graph. (what the growth in numbers of prisoners in Washington prisons will be)

   B. Point out the numbers on the vertical axis along with the caption. What will that scale measure? (numbers of prisoners, given in thousands)

   C. Point out the numbers on the horizontal axis. What will that scale measure? (years 1983 - 1996)

II. Fold down the first overlay, "Previously projected inmate population."

   A. Discuss what that line is measuring. (the old prediction for numbers of prisoners in the future)

   B. What generally had been predicted for numbers of prisoners in the future? (it would rise by about half)

   C. How many prisoners had been projected for 1989? (about 8,000)

III. Fold down the second overlay, "Planned capacity of all Washington prisons."

   A. Discuss the meaning of the caption. (how many prisoners the prisons are planned to hold)

   B. What happens to the planned capacity in the future? (It drops slightly in 1984, rises sharply in 1985, moderately in 1986, and then remains level)

   C. How does the capacity of prisons compare with the projected inmate population? (it isn't as high, except in 1986)

   D. What does this mean in terms of housing of prisoners? (If the previous projections are accurate, there would not be enough space for all the prisoners, and the problem would get worse in the future.)

IV. Fold down the third overlay, "Projected population with new sentencing laws."

   A. What has happened to the projected prison population? (It has decreased)

B. What is the reason shown for that change? (new sentencing law)

C. Therefore, how has the sentencing law probably changed? (fewer convicted criminals will be sentenced; criminals will be sentenced for shorter terms)

V. Fold down the fourth overlay with the questions.

1. Is the trend in previously projected inmate population an increasing or a decreasing one? (increasing)

2. Previously projected inmate population would have had Washington state prisons over the planned capacity by how many inmates in 1994? (two thousand)

3. New sentencing laws (early release, etc.) could have Washington's prison population under the planned capacity by how many in 1987-88? (about 1,000)

4. By 1986, planned capacity in Washington prisons will have increased by what percent over the 1983 level? (40% -- increase of 2 out of 5)

Teacher's Guide

LINE GRAPH 3 -- HOUSEHOLD INCOME

Words to Learn: category, bracket

I. Open the overlays to show only the title and bare graph.

A. What type of income information will be given in this graph? (information about household, or family, income)

B. What are the divisions of income given? (in thousands of dollars -- under 5, 5-10, 10-15, 15-20, 20-25, and over 25)

C. What do the percentages in the vertical axis represent? (percentage of families with a particular income)

II. Fold down the first overlay showing income in 1960.

A. What does this line show? (household income in 1960)

B. What do the points which are connected by the line represent? (what percentage of households had incomes in each category)

C. Into which income category did the largest percentage of households fall? ($15,000 - $20,000) the smallest percentage? ($20,000 - $25,000)

D. About what percentage of families had an income over $25,000? (about 18%)

III. Fold down the second overlay showing income in 1970.

A. What does this line indicate? (household income in 1970)

B. Generally, how does it differ from the 1960 line? (fewer families with low incomes, more families over $25,000)

C. Into which income category did the smallest percentage of households fall? (under $5,000)

IV. Fold down the third overlay showing income in 1980.

A. What does this third line show? (household income in 1980)

B. How does this line generally compare with the others? (same general trend with fewer families at the low end and a sharp increase over $25,000; however, a marked decrease in families receiving $15,000 - $20,000)

C. What is the difference in percentages of households with an income of under $5,000 in 1960 and 1980? (about a 4% difference)

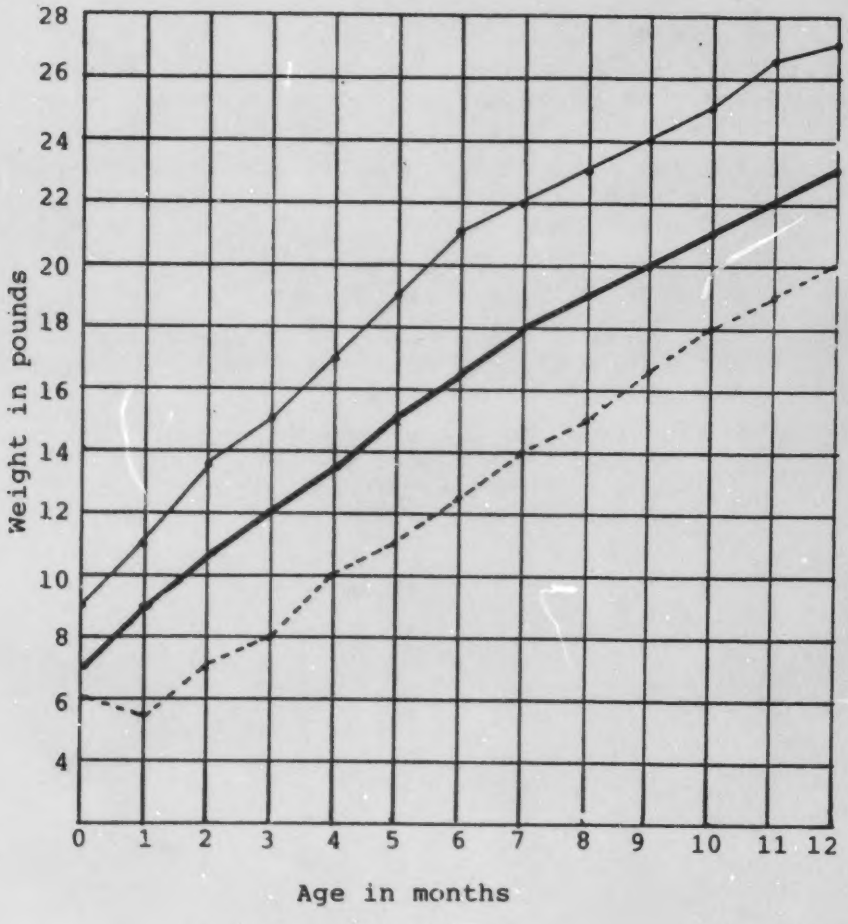
D. What percentage of households in 1970 had an income of $15,000 - $20,000? (20%) in 1980? (22½%)

V. Fold down the final overlay with the questions. Give students a few minutes to answer them on their own or in small groups.

1. The number of households in the highest income category increased by what percent from 1960 to 1980? (about 20%)
2. Families earning $10,000 or under decreased by what percent from 1960 to 1980? (about 6% - combine categories)
3. The greatest percent of change occurred between which two categories in 1970? (26% increase between ($20-$25,000 and over $25,000)
4. Compare the dollar income of the most households in 1960 to the most households in 1980. (In 1960, the highest percent was about 23% in $15-$20,000 category. In 1980, the highest percent was about 34% in over $25,000 category.)

Worksheet on Line Graphs

Infant Growth Graph



Marco ——

Billy - - - -

Average Growth for Boys ——————

1. How much did Marco weigh at birth?

2. What is the total amount that Billy has gained since birth?

3. What is the weight of each baby at three months?

4. Which baby has gained the most weight in 12 months?

5. At which month had Marco doubled his birth weight? Billy?

6. What is Marco's average monthly weight gain?

7. At 12 months, how much more does Marco weigh than the average male baby?

8. How much does the average male baby gain in one year?

9. How much less does Billy weigh than Marco at 12 months?

10. What percent of Marco's birth weight was Billy's birth weight?

Line Graph Worksheet -- Answer Key

1. nine pounds

2. 14 pounds

3. Billy 8 pounds
   Marco 15 pounds

4. Marco

5. five months, six months

6. $2 + 2\frac{1}{2} + 1\frac{1}{2} + 2 + 2 + 2 + 1 + 1 + 1 + 1 + 1\frac{1}{2} + \frac{1}{2} = 18$ lbs.
   18 lbs ÷ 12 = $1\frac{1}{2}$ lb. average weight gain

7. 27
   -23
   4 lbs.

8. 16 lbs.

9. 27
   -20
   7 lbs.

10. 6/9 = 66 $\frac{2}{3}$ %

Introduction to Lesson Four

READING CIRCLE GRAPHS

Background Information for Teachers:

Circle graphs show the division of a whole into parts. The sizes of the parts are representative of the amount of the whole represented. Because circle graphs look something like a pie which has been cut into pieces, they are also known as pie graphs.

The circle is divided into wedges by the use of angles. Since a complete circle contains 360°, taking a percentage or part of 360 will indicate the number of degrees which are included in each wedge. In other words, if a part is 25% of the whole, it will be represented by a wedge which is 25% of 360, or 90°. Because circle graphs are based on part or percentage of a whole, they are very often used for information which is divided into percentages.

Similar to the circle graph divided into percentages is the circle graph divided into parts of a dollar. The circle represents a dollar and the segments illustrate what part of the dollar is being discussed. Because cents and percentages both are hundredths, it is possible to change directly from cents out of a dollar to percentages.

The steps in reading a circle graph are:

1. Look at the title and any captions to determine the subject of the graph.
2. Consider how the "whole" is divided into parts. How many parts are there? How do they compare in size?
3. Look at specific percents given for each part. If they are not given, find numbers by taking percents of the whole.
4. Work with the numbers given to find totals or differences. As you work with the information, it becomes more meaningful.

Graphs given in this lesson include:

Graph 1 - Government Income

Graph 2 - Government Spending

Graph 3 - Population Distribution by Age

Worksheet - Johnson Family Income & Expenditures

Each of these graphs is on a transparency which should be shown to the class on an overhead projector. A separate Teacher's Guide for each transparency follows the lesson introduction.

Teacher's Guide

CIRCLE GRAPH 1 -- GOVERNMENT DOLLARS -- WHERE THEY COME FROM

Words to Learn: contributions, excise, corporation, receipts

I. Open the overlays to show only the title and the bare graph.

A. Point out the circular shape which gives the graph its name. These graphs are sometimes known as pie graphs. Why? (Because they resemble a pie cut in pieces.)

B. The different-sized segments of a circle graph represent different-sized parts of a whole. What is the "whole" represented here? (One dollar of the government's income.)

C. How many parts is that dollar divided into? (six) Are all of these parts the same size? (No - two are quite large and four are quite small. Even the large and the small are different sizes.)

II. Fold down the first overlay with the labels for the different segments.

A. Help the students to read the labels and then discuss briefly what each segment represents.

Individual Income Taxes - (paid by every working person)
Social Insurance Taxes/Contributions - (social security)
Corporation Income Taxes - (paid by businesses)
Borrowing - (bonds and securities sold to citizens, banks, and businesses)
Excise Taxes - (taxes on products and goods)
Other Taxes - (customs taxes, estate and gift taxes, and other miscellaneous receipts)

B. Have the students rank the order of the receipts from largest to smallest. (See ranking above. Point out that this can be only an estimate without having exact figures.)

III. Fold down the second overlay with amounts given.

A. What do the amounts written here actually show? (The part of each government dollar which is received from various places. Emphasize that this is not a total, not is it to be measured in millions, billions, etc. -- it is the part of a single dollar.)

B. What part of a dollar is a cent? ($\frac{1}{100}$) What part of a whole is one percent? ($\frac{1}{100}$) Therefore, could each of these figures also be read as a percent of the total amount received? (yes) What percent of our national income comes from individual income taxes? (43%)

C. Which area provides a larger source of income -- excise taxes or borrowing? (borrowing)

IV. Fold down the question overlay.

1. The largest portion of government dollars comes from which group? (individual taxpayers)
2. What percent of government receipts comes from excise and other taxes? (10 %)
3. If the government received $602.6 billion last year, how much come from Social Security, other insurance and retirement taxes, and contributions? ($168.7 billion)

Teacher's Guide

CIRCLE GRAPH 2 -- GOVERNMENT DOLLARS -- WHERE THEY GO

Words to Learn: veterans, resources, security, deficit

I. Open the overlays to show only the title and bare graph.

A. How does this graph differ from the one we just saw? (It shows government spending, not income.)

B. The different-sized segments of a circle graph represent different-sized parts of a whole. What is the "whole" represented here? (A government dollar which is spent.)

C. How many parts of that whole are there? (eight) Are all of the parts the same size? (No, some are larger than others.)

II. Fold down the first overlay with the labels for the different segments.

A. Ask eight different students to name the areas where the government spends money. (Income Security; National Defense; Health; Interest; Education, training, and social services; Transportation; Veterans; and Other)

B. Which groups are approximately equal in amount spent?
(income security = national defense
health = interest = other
veterans = transportation = education, training, and social services)

C. What does the yellow shading on the graph indicate? (These are areas which are considered human resources.) What does the term human resources mean? (Those are areas which have direct impact on people.)

III. Fold down the second overlay which gives amounts.

A. What do the amounts written here actually show? (The part of each government dollar which is spent in the various areas. Emphasize that this is not a total, nor is it to be measured in millions, billions, etc. -- it is the part of each single dollar.)

B. Remember that each of these figures could also be read as a percent of the total amount spent. Therefore, what percent of government dollars goes toward interest on our national debt? (10 %)

C. Which area requires more money -- defense or income security? (income security, which includes social security, unemployment, food stamps, and housing subsidies.)

IV. Fold down the question overlay.

1. What percent of government dollars are used to support human resources? (53 %)
2. If the government spent $660.5 billion last year, how many dollars were spent on defense? ($158.52 billion)
3. On what two areas was the least money spent?
   (1-Transportation 2-Education, Training, and Social Services)
4. If the government received $602.6 billion and spent $660.5 billion, what was the amount of deficit? ($57.9 billion)

Teacher's Guide

CIRCLE GRAPH 3 -- POPULATION DISTRIBUTION BY AGE

Words to Learn: distribution, categories

I. Open the overlays to show only the title and the empty graph.

   A. What will this graph tell you? (how our population was divided according to age in 1980)

   B. What is the number of people which is being divided into groups? (see total -- 226,545,805 people)

   C. Into how many groups was the population divided? (five)

   D. Are all of the groups the same size? (No. One is the largest, and the others are approximately equal pairs.)

II. Fold down the first overlay with the age categories given. Give the students a moment or two to study them.

   A. Each individual should identify for himself/herself the category to which he or she belongs. Is your group a majority of the population? (No one group is a majority, which means more than half, even though the 20-44 age group is the largest.)

   B. Which group is the smallest? (under 5) What would be a possible reason for this? (lower birth rate or high rate of infant and child deaths)

   C. What other group is small? (65 and over) What would be a possible reason for this? (Many people die before reaching age 65.)

   D. Why do you think the group age 20-44 is so large? (Primarily it is because of the "baby boom" of people born in the late 1940's and early 1950's after World War II.)

   E. About what part of the whole is the category 5-19? (about ¼, or 25%)

III. Fold down the second overlay with the percentages given.

   A. What percent of the total population was the 5-19 age group? (24.8 %) Is that close to the estimate we made earlier?

   B. What is the difference in percentage between the categories of 45-64 and 65 and over? (8.3 %)

   C. If all of these percentages are added together, what is the total? (100%. If some students find it necessary to add the numbers, point out that a whole is always equal to 100%.)

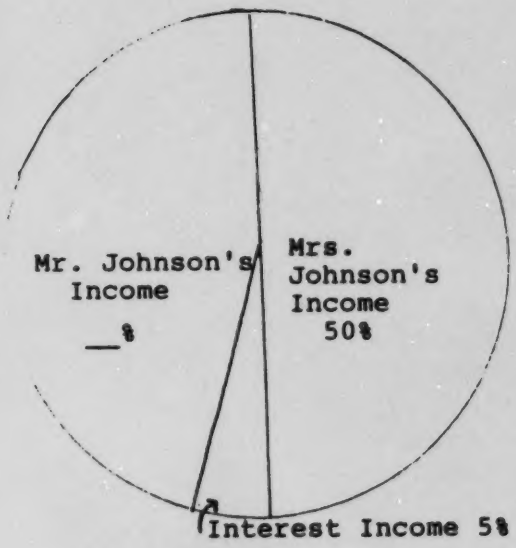
D. If the total population is 226,545,805 people and 7.2% of those people are under 5, how many children under age 5 are there in the population? (16,311,297.96, or about 16,300,000)

IV. Fold down the final overlay with the questions. Give students time to answer them either individually or in groups. When they have completed, discuss the answers.

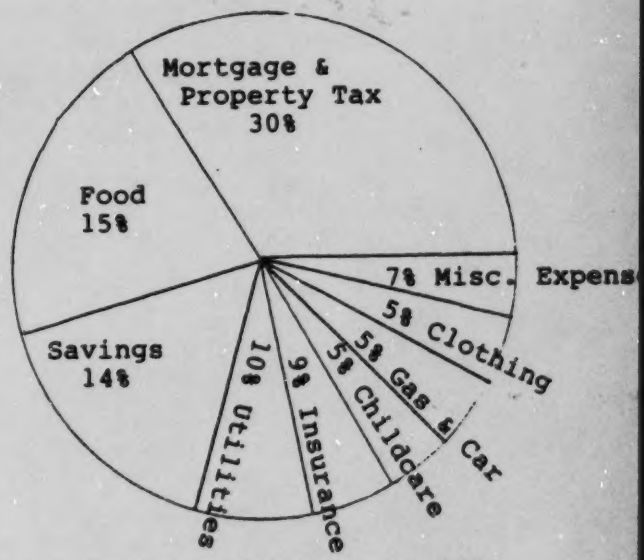
1. What percent of the population is 19 years of age or under? (32 %) 45 or over? (30.9 %)
2. About how many people are between the ages of 20 and 44? (84,048,493.655 or about 84,000,000)
3. The number of people between 20-44 is larger than the number of people under 5 by about how many times? (about 5 times -- 7 x 5 = 35)
4. The largest increase in percent of the population occurs between which age categories? (under 5 to 5-19 = 17.6% increase)

Worksheet on Circle Graphs

Johnson Family January Income and Expenditures



Total Net Income $2,000



Total Expenditures $2,000

1. What percent of the total family income does Mr. Johnson earn?

2. How much is Mr. Johnson's take-home pay per month? Mrs. Johnson's?

3. What is the largest expense for the Johnson family each month?

4. What fraction of the income is interest income?

5. Fill in the dollar amounts for the Johnson expenditures. The first one is done for you.

   Mortgage & Property Taxes $600
   Misc. Household & Other Expense
   Clothing
   Insurance (Life,Medical,&Car)
   Gas & Car Maintenance
   Childcare
   Utilities
   Food
   Savings

6. What fraction of the budget does each category represent? Add your answers to the chart above.

7. How many cents of each dollar are spent on utilities?

Johnson Family January Income & Expenditure -- Answer Key

1. 45% 50% 100%
   +5% -55%
   55% 45%

2. 45% of $2000 = $900
   50% of $2000 = $1000

3. Mortgage & Property taxes

4. $\frac{14}{100} = \frac{7}{50}$

5.	Misc. Household & Other Expense	$140	3/10
	Clothing	$100	7/100
	Insurance (Life, Medical, & Car)	$180	1/20
	Gas & Car Maintenance	$100	9/100
	Childcare	$100	1/20
	Utilities	$200	1/20
	Food	$300	3/20
	Savings	$280	7/50

6. See fractions on answer 5.

7. 10¢

Introduction to Lesson Five

READING CHARTS

Background Information for Teachers:

Charts are the least visual of the charts and graphs included in this unit. For this reason, they are sometimes considered to be more difficult than other types of graphs. They must be studied carefully; it is usually not possible to get a quick visual impression of a trend or comparison.

Usually the information in a chart is given in numbers which are in columns. These numbers may be compared to find differences between the various items. A question may ask about a specific detail or number given in the chart, or it may ask about differences between various items. Other questions may ask about percent of increase or decrease or totals. These last questions will require the reader to combine information and do some elementary calculations in order to find the answer.

It may be worthwhile to caution students to use a ruler or straightedge when reading charts. This will insure that they do not get different columns confused.

Steps in reading a chart include:

1. Read the title.
2. Read the headings and the units of measurement. Do not assume that these will be the same for every column.
3. Think about the ideas being presented or the items being compared. Try to get an overall idea of the information being given before looking for specific detail information.
4. Look for some specific details in one category.
5. Compare several different categories to find differences.
6. Practice working with some of the information to find percents or totals or other related details.
7. While reading a chart, be careful to read both the chart and the question to know exactly what information is given and what information is asked. For example, if information is given for one year but a question asks for that information for a month, it will be necessary to divide by 12.

Charts given in this lesson are:

Chart 1 - Sweat Pant Sizes

Chart 2 - Comparison of Microcomputers

Chart 3 - Deficit Spending

Worksheet - Checking Account Comparison

Each of these graphs is on a transparency which should be shown to the class on an overhead projector. A separate Teacher's Guide for each transparency follows the lesson introduction.

Teacher's Guide

CHART 1 -- WOMEN'S SWEAT PANTS SIZE CHART

I. Open the overlays to show only the title and the empty chart.

A. What does the title tell you about how this chart will be used? (in choosing a correct size in sweat pants)

B. What do the numbers on the left represent? (Height. Point out the symbols for feet and inches.) What is the shortest height given and the tallest? (4 ft. 10 in. to 6 ft.)

C. What do the numbers along the top represent? (Weight in pounds) What is the lowest weight given? (90 lbs.) The highest? (170 lbs.)

II. Fold down the first overlay with the small size range.

A. What does this shading show? (the height and weight limits for wearing a size small)

B. What two things must you know before choosing the correct size? (height and weight)

C. What is the most that a woman who is 5'2" could weigh and still wear a size small? (110 lbs.)

III. Fold down the second overlay with the medium size range.

A. What new information has been added? (the height and weight limits for wearing a size medium)

B. If a woman is 5'4" and weighs 130 lbs., what size should she choose? (medium)

C. If one woman is 5'2" and weighs 120 lbs. and another woman is 5'6" and weighs 110 lbs., would they wear the same size or different sizes? (same -- medium)

IV. Fold down the third overlay with the large size range.

A. Now what information has been added? (height and weight limits for the large size range)

B. What is the lightest weight included in the large size range? (120 lbs.) the heaviest weight? (170 lbs.)

C. If a woman were 5'9" and weighed 130 lbs., would she wear a medium or a large? (large. Point out that it falls between the given heights, but is still in the range)

V. Fold down the final overlay with the questions.

1. If you are 5'2" tall and weigh 135 lbs., what size sweat pants should you buy? (medium)
2. If you are 5'4" and weigh 120, how many pounds can you gain and still wear the same size? (30 lbs.)
3. If you are 5'7" and weigh 125 lbs., what size sweat pants should you buy? (medium. It is necessary to look between 5'6" and 5'8", but it is still in the same range.)
4. Without considering weight, what are the heights of the shortest and the tallest women who might wear a size large? (5'4" to 6'0")

Teacher's Guide

CHART 2 -- COMPARISON OF MICROCOMPUTER SYMTEMS

Words to Learn: microcomputer, processor, multiple, software, optional, manufacturer

I. Open the overlays to show the title and the empty graph.

A. What information will this chart give the reader? (It will compare different microcomputers.)

B. How many microcomputers are being compared? (six) What are their names? (Hazlit/9, 735R, Champ, Camsoft, 89-02, and New Age)

C. What do the captions down the left mean? (Those are the parts of the microcomputers being compared.)

D. Of course the information from a chart such as this will be more meaningful if you are familiar with the items being compared, but it is not necessary to understand completely all of the captions in order to read it. The names of the computers are fictional, but the items being compared are actually components of a real microcomputer system.

II. Fold down the first overlay giving the legend. These are explanations of some of the abbreviations used on the chart.

A. What does a "Y" stand for? (Yes)

B. What does "NI" stand for? (Not Included)

C. What does an asterisk (*) indicate? (extra cost)

III. Fold down the second overlay with the charted information.

A. This chart may be used in two ways: 1) to get information about a particular computer, and 2) to compare the components of several different computers.

B. First, let's practice getting information about specific computers. What is the minimum and maximum memory of the Champ? (16/16) What special feature does the Camsoft have? (16 colors) What is the cost of the New Age? ($1150)

C. Now let's compare some of the different computers . Which is the cheapest? (735R - $698) The most expensive? (89-02 -- $1495) Which computers use a Z80 processor? (735R, Camsoft, and New Age) Which has more lines, the Hazlit/9 or the Camsoft? (The Camsoft has 30; the Hazlit/9 has only 24. Point out that the caption shows both lines and "char" = characters, but that lines are given first.)

D. Now let's look at some of the information contained in the key. Does the Champ have software? (Yes)
Give an example of something which is not included and tell which computer does not include it. (the Champ does not include lower case; the Camsoft does not include display)
What costs extra on most of the computers? (cassette or mini-disk)

IV. Fold down the third overlay with the questions.

1. Which computers have the cassette included? (735R and the 89-02)

2. Which computers have at least 28 lines of text? (Camsoft and 89-02)

3. If you need to use lower case letters, which computers would not be good choices? (Champ and New Age)

Teacher's Guide

CHART 3 -- BUDGET DEFICITS

Words to Learn: deficit, thereafter, majority, administration

I. Open the overlays to show only the title, the labels, and the note at the bottom on the chart.

A. What is the subject of this graph? (budget deficits, or amount spent above earned.)

B. Does this chart relate to budget deficits of a specific family? (No, the label "President" indicates that it will deal with federal deficit)

C. Point out the note at the bottom of the chart. Explain the meaning of this note. (The years given are not calendar years, and the President listed may not have been in office for the complete year.)

II. Fold down the first overlay with the deficits listed along with the names of the Presidents.

A. How far back does this chart go? (to 1934, when Franklin Roosevelt came into office.)

B. How many Presidents are listed? (nine)

C. What was the deficit in 1934? ($3.6 billion -- show key that indicates information is given in billions)

D. Notice that between 1941 and 1942, the deficit increased dramatically. Can you think of a reason that might be true? (government financing of World War II)

E. Is the deficit higher or lower now than it has been at most times in the past? (a great deal higher)

F. How much greater was 1983's deficit than 1982's? ($208.0 - $110.7 = $97.3 billion)

III. Fold down the second overlay with surplus figures listed.

A. What new information has been added to the graph? (figures showing that some years had a surplus rather than a deficit)

B. How many years since 1934 have had a budget surplus? (eight years)

C. What was the difference between the budget deficit of $15.9 billion in 1946 and the surplus of $3.9 billion in 1947? (This is not just a simple subtraction problem. The deficit is a negative number and the surplus is a positive number. $3.9 - (-$15.9) = $19.8 billion)

IV. Fold down the third overlay with the questions listed.

1. The largest annual deficits occurred during the administrations of which two Presidents? (Ford, 1976 = $79.4 billion; Reagan, 1983 = $208 billion)

2. Which President had the lowest total deficit for his administration? (Truman = $12.2 billion) the highest? (Reagan = $376.6 billion)

3. Reagan's total deficit is about how many times greater than Carter's total deficit? (about two times greater -- $181 compared to $376.6)

Worksheet on Charts

Checking Account Comparison Chart

Bank	Plus Checking Accounts			Super Checking Accounts		
	Rate	Min. Bal. for free checking	Monthly Service Fee	Rate	Min. Bal. for free checking	Monthly Service Fee
1st Federal	5¼%	$1,000	$5 if bal. below $1000	6½%	$5,000	$6 if bal. below $5000
1st Atlantic	5¼%	$2,500	$6 if bal. below $2500	7 %	$5,000	20¢/ck + $5 if bal. below $5000
Franklin	5¼%	$1,000	$7 if bal. below $1000	7½%	$5,000	$8 if bal. below $5000
State Mutual	5 %	$2,500	$5.50 if bal. below $2500	5¼%	$5,000	20¢/ck + $7 if bal. below $5000
National	5¼%	$250	$5 if bal. below $250	6½%	$2,000	$10 if bal. below $2000

1. Which bank requires the lowest minimum balance for free checking?

2. Which bank offers the highest rate of interest for their Super Checking accounts?

3. If your Plus Checking account balance was $2,000, how much would you pay for a monthly service charge at 1st Atlantic? at State Mutual? at Franklin?

4. If you had a Plus account at National with a balance of $1,500, how much interest would you earn for one month?

5. Since interest is paid on the total balance, how much would you earn for one month on $2,500 at National if you had a Super Checking account?

6. What would be your monthly service fee if you had a balance of $3,000 in your Super account at 1st Atlantic and had written eight checks?

7. Answer question 6 again, but this time your Super account is at National.

8. If you normally keep over $5,000 in your checking account, would it be better to keep your money in a Plus account or a Super account?

9. You are planning to open a Super Checking account. In which bank would you open it? (You plan to keep $5000 or more in the account and all banks are equally convenient.)

10. Your Super Checking account balance at State Mutual falls below $5000 during March and you have written 20 checks. What will your service charge be?

Checking Account Comparison Chart -- Answer Key

1. National Bank
2. Franklin Bank
3. 1st Atlantic $6
   State Mutual $5.50
   Franklin $0
4. $1500 x 5⅛% ÷ 12 = $6.56
5. $2500 x 6⅛% ÷ 12 = $13.54
6. 8 x 20¢ = $1.60; Service fee = $5.00 $5.00 + $1.60 = $6.60
7. no service fee
8. Super account because the interest is higher.
9. Atlantic because it pays the highest rate of interest.
10. 20¢ x 20 = $4.00; Service fee = $7.00 $4.00 + $7.00 = $11.00

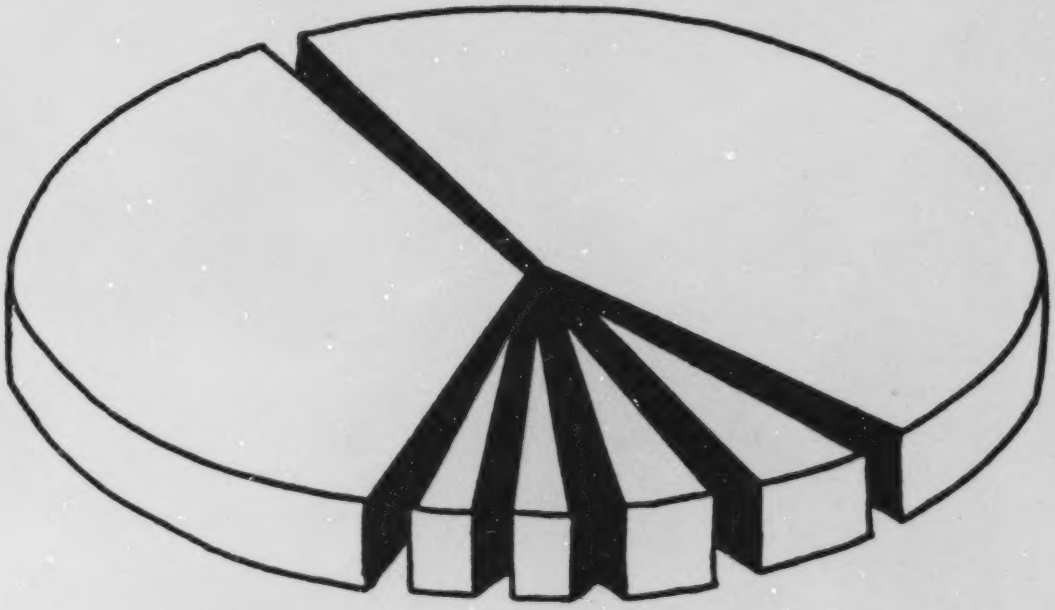
DR. FRANK B. BROUILLET
Superintendent of Public Instruction

Old Capitol Building, FG-11, Olympia, WA 98504

VE/201/84

PROJECT ON TEACHING CHARTS AND GRAPHS TO ABE STUDENTS

PART II
TRANSPARENCY ASSEMBLY PACKAGE



1983

PROJECT ON TEACHING CHARTS AND GRAPHS TO ABE STUDENTS

PART II TRANSPARENCY ASSEMBLY PACKAGE

This publication was the product of and partially funded by Federal funds distributed by the Office of the State Superintendent of Public Instruction, Olympia, Washington 98504.

Dr. Frank B. Brouillet
Superintendent of Public Instruction

Bruce Brennan
Assistant Superintendent
Division of Vocational-Technical
and Adult Education Services

Beret Harmon
Director of Adult Education and Community Schools

SPECIAL EXPERIMENTAL DEMONSTRATION PROJECT -- ADULT EDUCATION

Public Law 91-230, As Amended Through November 1, 1978
Section 310 (1) (A) and (B)

FISCAL YEAR 1983

A PROJECT TO TEACH THE CONCEPTS OF CHARTS AND GRAPHS TO ADULT BASIC EDUCATION STUDENTS

RENTON VOCATIONAL TECHNICAL INSTITUTE
3000 Northeast Fourth Street
Renton, Washington 98056

Dr. Robert C. Roberts, Project Director
Barbara J. Moses
Janice L. Boccato
Donna Miller-Parker

July 1, 1982 - July 15, 1983

Robert C. Roberts, Ed.D. 7-14-83

Dr. Robert C. Roberts Date

This project meets priorities 4, 5, 6, and 8, in that it develops a set of competency-based instructional materials, guidelines for their use, and instructional aids for teachers. Content of the project assists in the improvement of instructional practices in adult education targeted at the improvement of basic reading and comprehension skills needed to function effectively in the adult environment.

SUGGESTIONS:

Write on transparencies with special overhead transparency pens only.

Notes and answers may be written on the mounting frame.

Scotch tape may be used to attach transparencies to the mounting frame. Hinges last longer but tape is easier to use.

Secure transparency layers on different edges as this makes it easier to balance the set on the overhead when the layers are open.

If a large shaded area is needed, self adhesive film may be used rather than making a transparency from a Xerox master. Self adhesive film is harder to use but many more colors are available.

TYPE OF GRAPH	SET NAME	PAGE	CONTAINS	SUGGESTED COLOR
CIRCLE, Continued	Government spending	0	Composite	-----
		1	Title/circle	Blue
		2	Labels (also shade with self adhesive film or overhead pen)	Red
		3	Cents	Green
		4	Questions	Purple
	Population distribution	0	Composite	-----
		1	Title/circle	Green
		2	Age labels	Purple
		3	Percent labels	Red
		4	Questions	Blue
CHART	Sweat pants	0	Composite	-----
		1	Title/labels	Purple
		2	Shading/small	Red
		3	Shading/medium	Green
		4	Shading/large	Blue
		5	Questions	Purple
	Computer comparison	0	Composite	-----
		1	Title/labels	Blue
		2	Key	Green
		3	Data	Purple
		4	Questions	Red
	Budget deficits	0	Composite	-----
		1	Title/format	Purple
		2	Deficits	Red
		3	Surpluses	Blue
		4	Questions	Green

TYPE OF GRAPH	SET NAME	PAGE	CONTAINS	SUGGESTED COLOR
BAR	Oil Consumption	0	Composite	-----
		1	Title/labels	Green
		2	Bars	Purple
		3	Questions	Blue
	Jobs in Washington	0	Composite	-----
		1	Title/labels	Green
		2	1982 jobs	Purple
		3	1987 jobs	Red
		4	Questions	Blue
	Earnings Distribution	0	Composite	-----
		1	Title/labels	Blue
		2	Women's earnings	Red
		3	Men's earnings	Purple
		4	Questions	Green
LINE	Monthly rainfall	0	Composite	-----
		1	Title/labels	Green
		2	Line	Purple
		3	Questions	Blue
		4	Monthly totals	Red
	Prison population	0	Composite	-----
		1	Title/labels	Purple
		2	Previous	Red
		3	Capacity	Green
		4	New sentencing	Blue
		5	Questions	Red
	Household Income	0	Composite	-----
		1	Title/labels	Blue
		2	1960	Purple
		3	1970	Green
		4	1980	Red
		5	Questions	Blue
CIRCLE	Government income	0	Composite	-----
		1	Title/circle	Purple
		2	Labels	Green
		3	Cents	Red
		4	Questions	Blue

TRANSPARENCY ASSEMBLY PACKAGE

MATERIALS NEEDED:

Overhead projector
Transparency maker
Transparency masters
Transparency film (3M Type 888, rainbow, about $35 per 100 sheets)
Overlay hinges (about $15 per six-roll pack)
Color adhesive film, optional (about $18 per 20 sheets)
Transparency mounting frames (about $15 per 100)

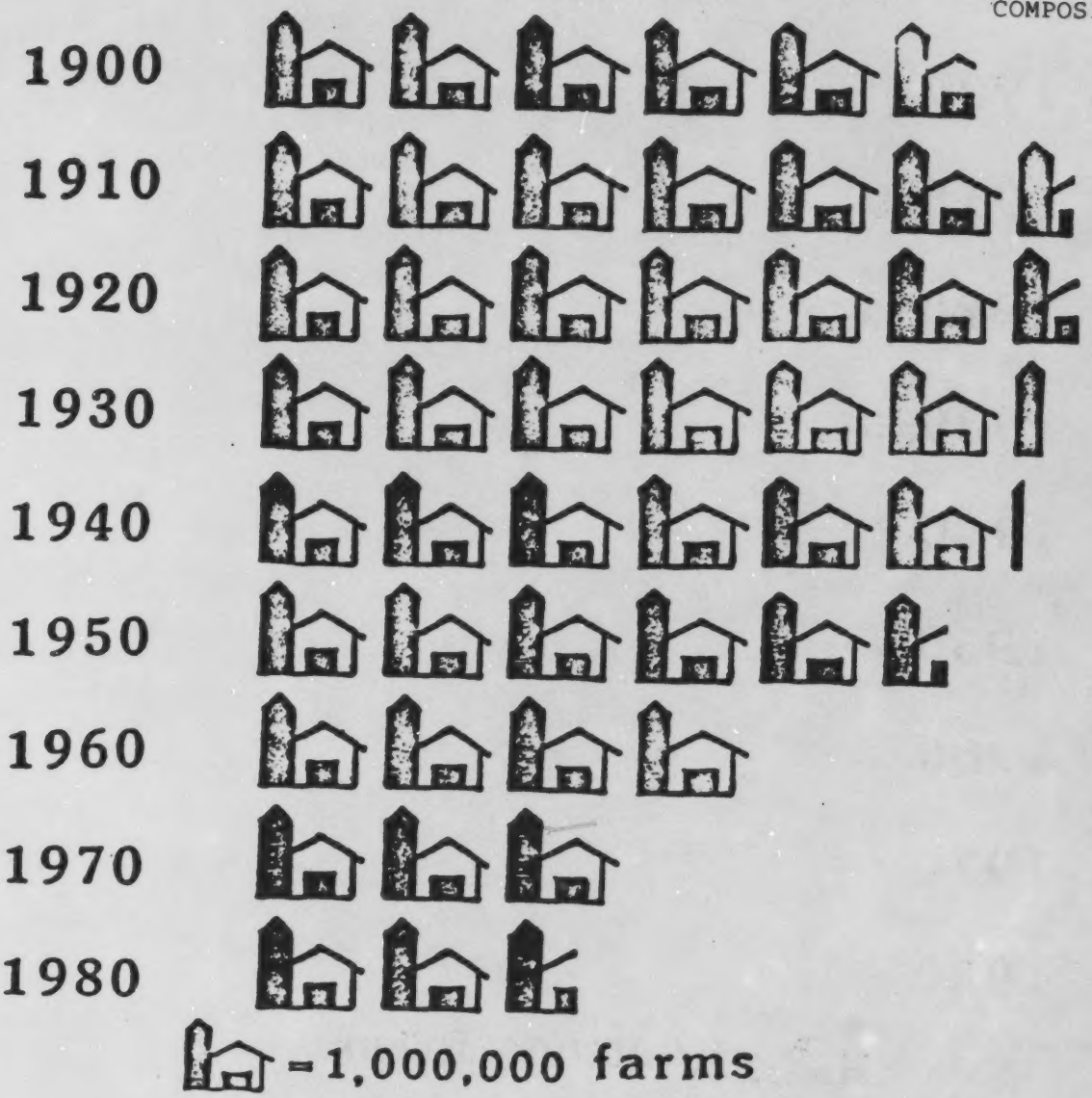
PROCEDURE:

Using the transparency masters which follow, prepare each transparency according to the directions on the transparency film package.
Assemble each transparency set by securing the title transparency on all four edges to the back of the frame using overlay hinges or tape. Attach one edge of each succeeding transparency separately to the front of the frame using hinges or tape.
(A composite graph is included only to show the appearance of the final graph.)

TYPE OF GRAPH	SET NAME	PAGE	CONTAINS	SUGGESTED COLOR
PICTURE	Number of Farms	0	Composite	-----
		1	Title/years	Blue
		2	Barn pictures	Red
		3	Questions	Purple
	Alcohol Affects Body	0	Composite	-----
		1	Title/labels	Green
		2	Bottles/1st half	Purple
		3	Bottles/2nd half	Red
		4	Questions	Green
	Tax Exemptions	0	Composite	-----
		1	Title/labels	Purple
		2	Money	Green
		3	Questions	Blue

NUMBER OF FARMS

COMPOSITE



1. The greatest decrease in the number of farms occurred between which years? The greatest increase?
2. There has been a decreasing trend in the number of farms for how many years?
3. The number of farms has decreased by how many from 1920 to 1980?
4. The number of farms in 1970 was about what percent of the year with the greatest number of farms?

NUMBER OF FARMS

1900

1910

1920

1930

1940

1950

1960

1970

1980

- 1,000,000 farms

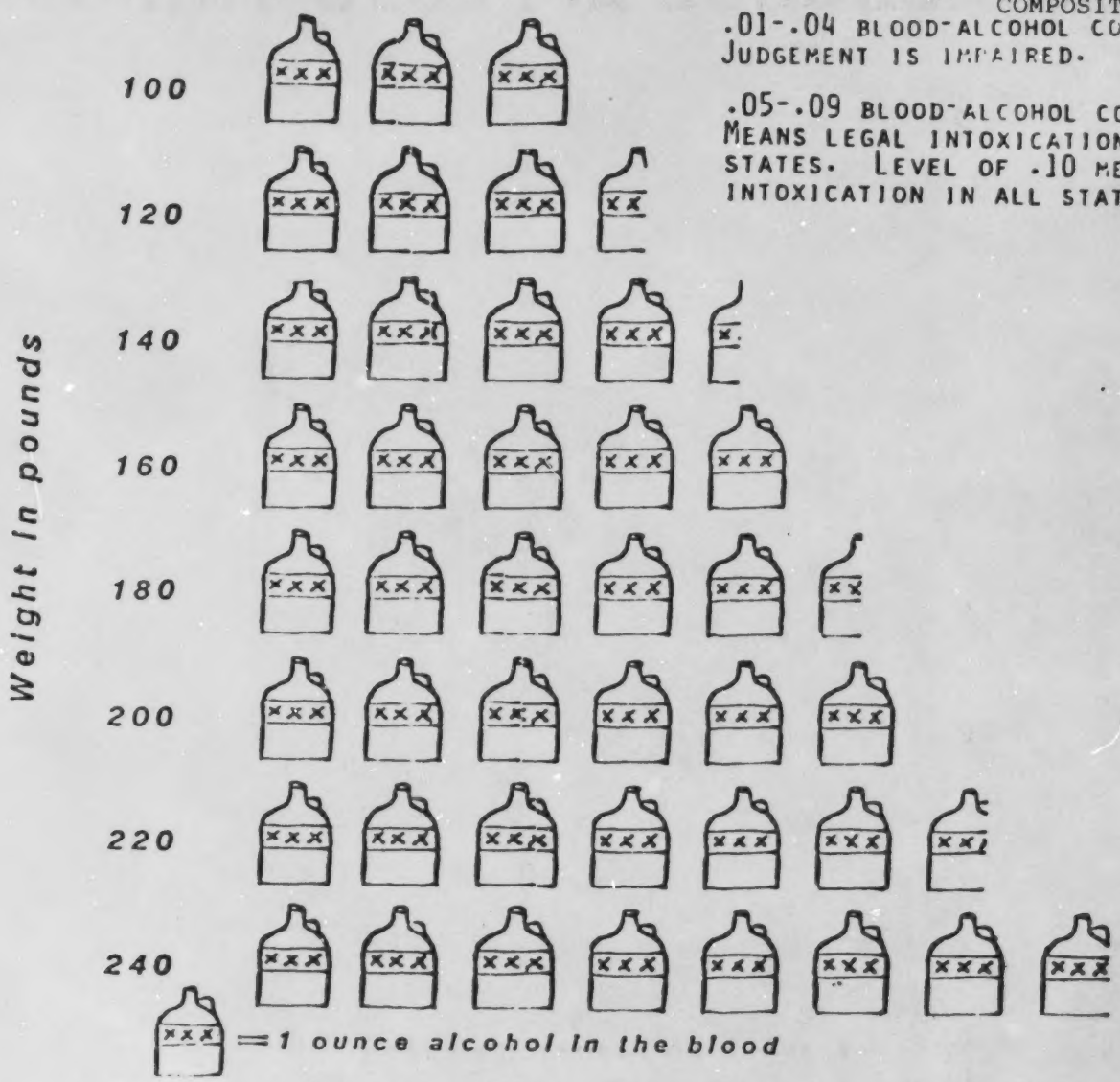
1. The greatest decrease in the number of farms occurred between which years? The greatest increase?
2. There has been a decreasing trend in the number of farms for how many years?
3. The number of farms has decreased by how many from 1920 to 1980?
4. The number of farms in 1970 was about what percent of the year with the greatest number of farms?

HOW ALCOHOL AFFECTS THE BODY

COMPOSITE

.01-.04 BLOOD-ALCOHOL CONTENT JUDGEMENT IS IMPAIRED.

.05-.09 BLOOD-ALCOHOL CONTENT. MEANS LEGAL INTOXICATION IN [illegible] STATES. LEVEL OF .10 MEANS INTOXICATION IN ALL STATES.



1. If a 12-ounce can of beer adds one ounce of alcohol to the blood, how many beers could a 200 pound person consume before he was legally intoxicated?
2. If every 5 ounces of wine adds one ounce of alcohol to the blood, a 160 pound person could drink how many ounces of wine before reaching the .05 level?
3. A 180 pound person would have to consume how many ounces of alcohol to reach .09 blood-alcohol content?
4. If a state's legal intoxication level is .10, a 220-pound person could consume how many more ounces of beer than a 120-pound person and remain under the legal intoxication level?

HOW ALCOHOL AFFECTS THE BODY

Weight in pounds

100

120

140

160

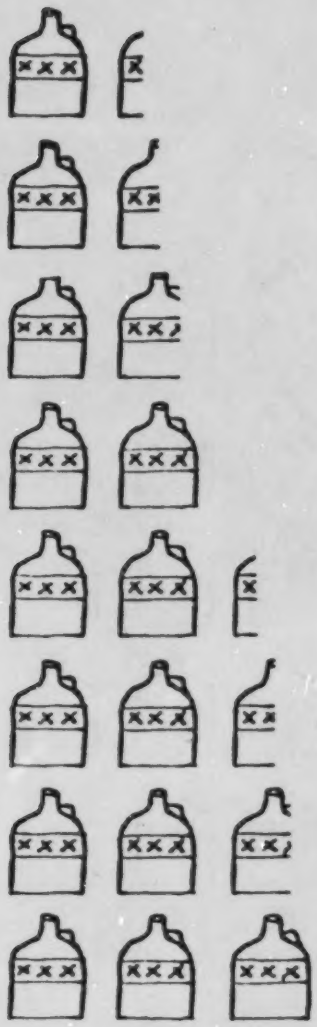
180

200

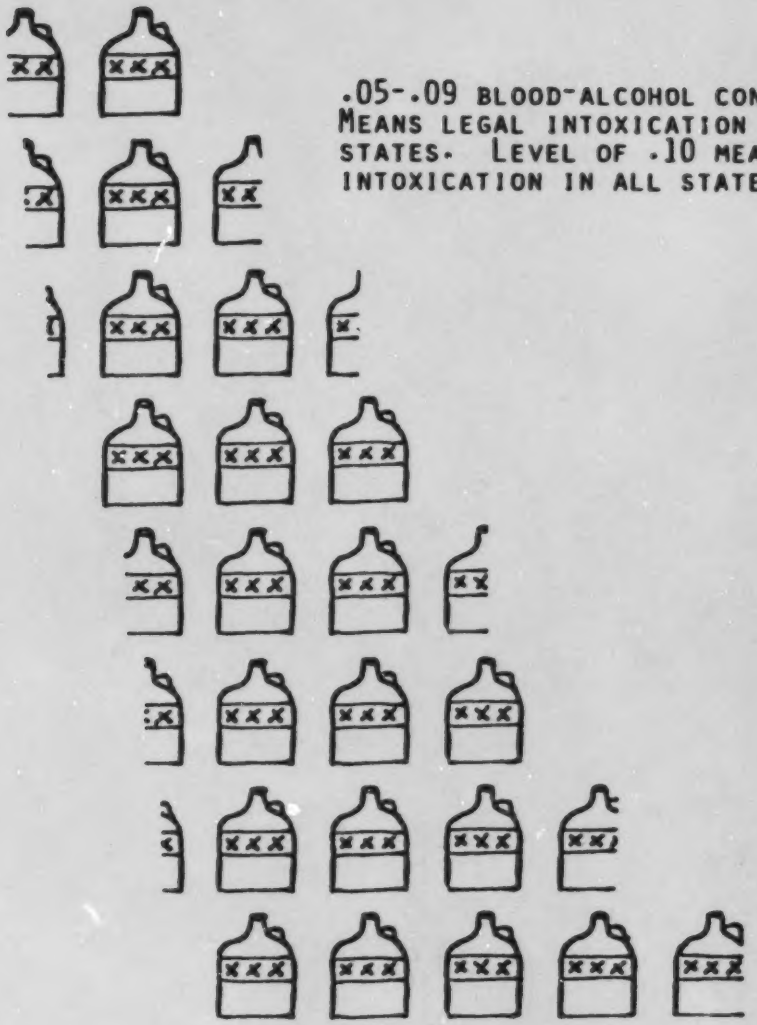
220

240

= 1 ounce alcohol in the blood



.01-.04 BLOOD-ALCOHOL CONTENT
JUDGEMENT IS IMPAIRED.



.05-.09 BLOOD-ALCOHOL CONTENT. MEANS LEGAL INTOXICATION IN SOME STATES. LEVEL OF .10 MEANS INTOXICATION IN ALL STATES.

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TAX EXEMPTIONS FOR MARRIED COUPLES

1. The current trend toward higher tax exemptions has continued for how many years?
2. The amount of the tax exemptions for 1925-31 was how much greater than the tax exemption for 1970?
3. In 1983, the amount of the tax exemption was what percent greater than the amount for 1945?

TAX EXEMPTIONS FOR MARRIED COUPLES

1913-16

1917-20

1921-24

1925-31

1932-39

1940

1941

1942-43

1944-47

1948-69

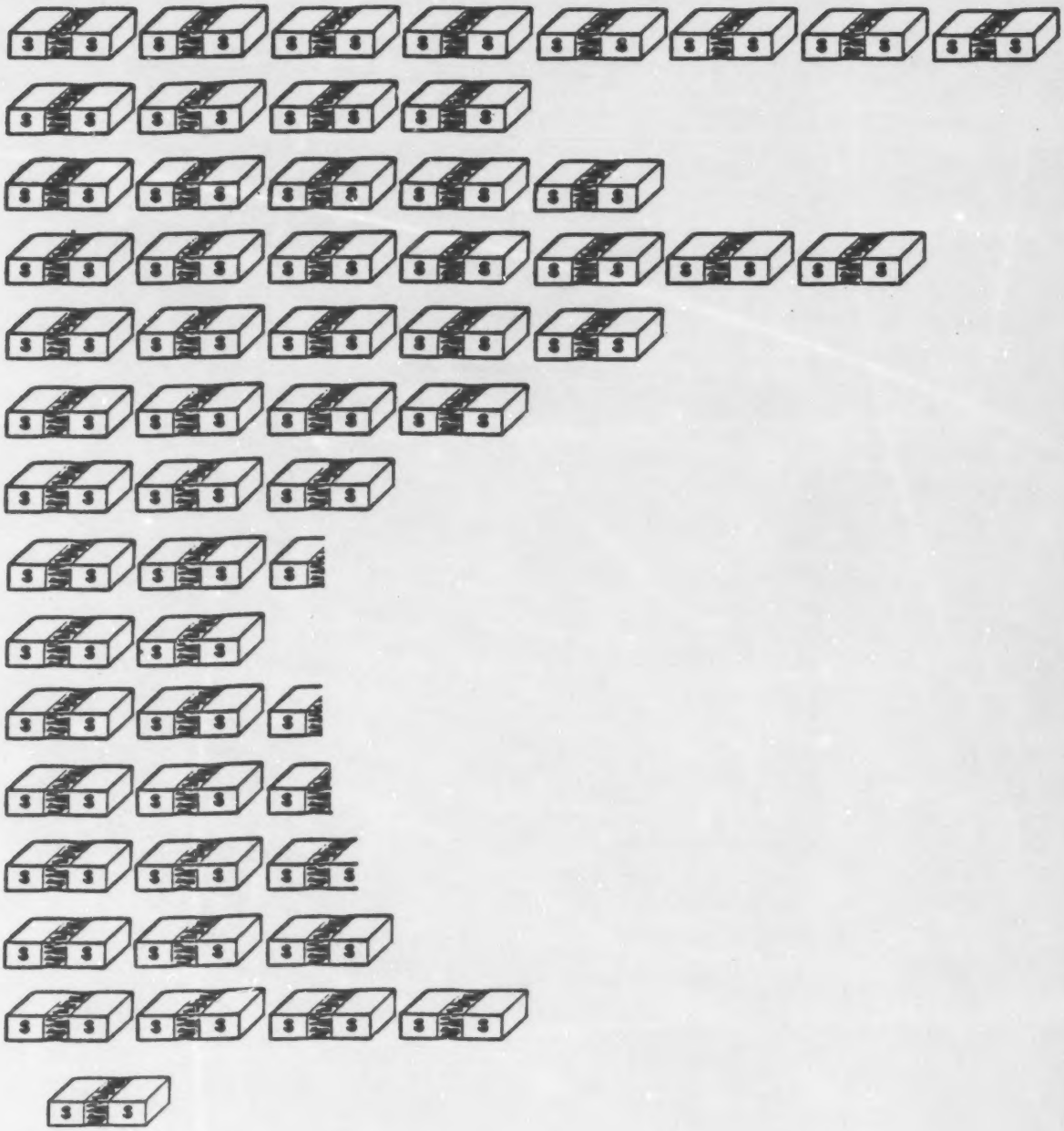
1970

1971

1972-78

1979-83

= $500



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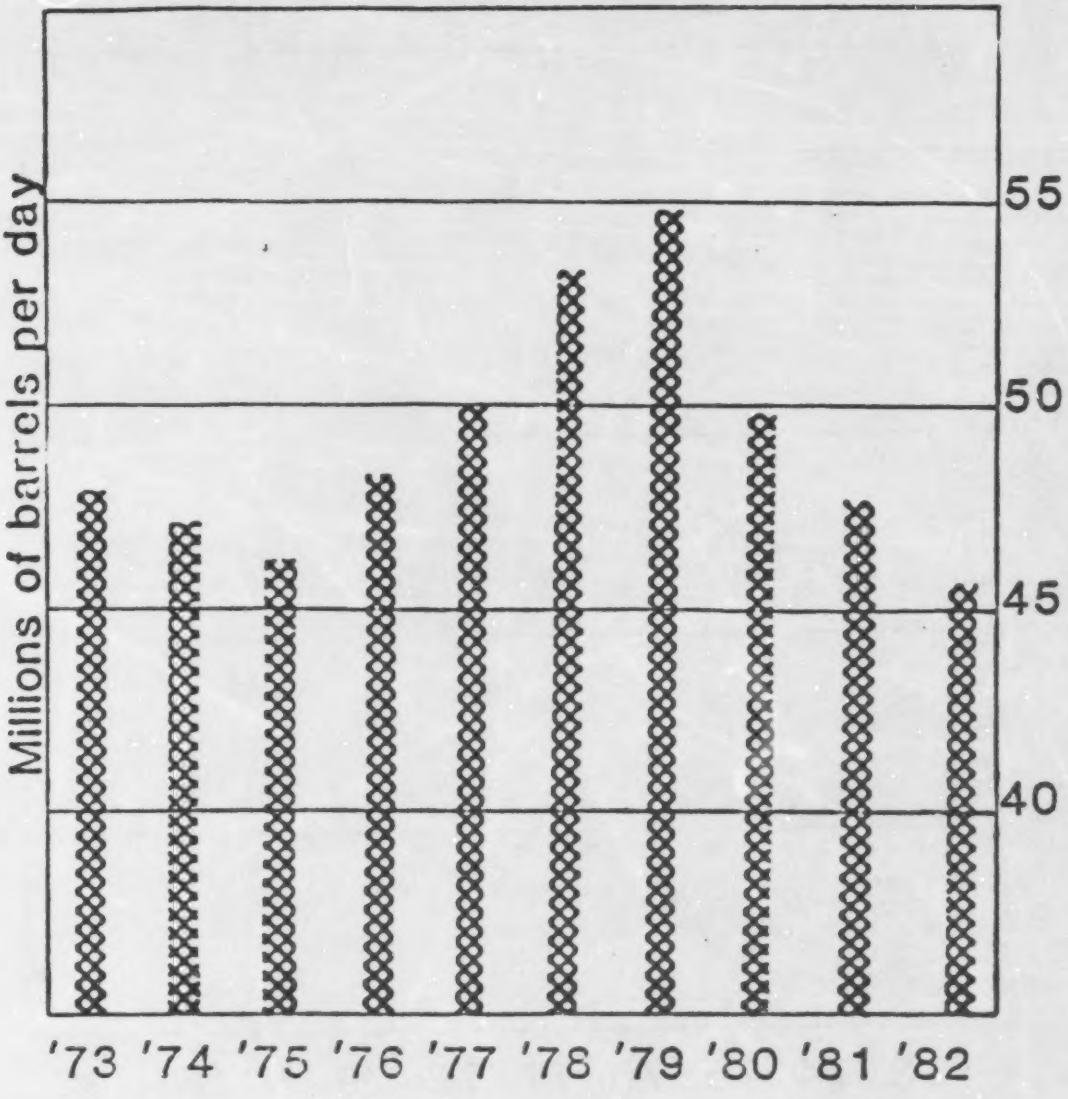
FREE WORLD OIL CONSUMPTION



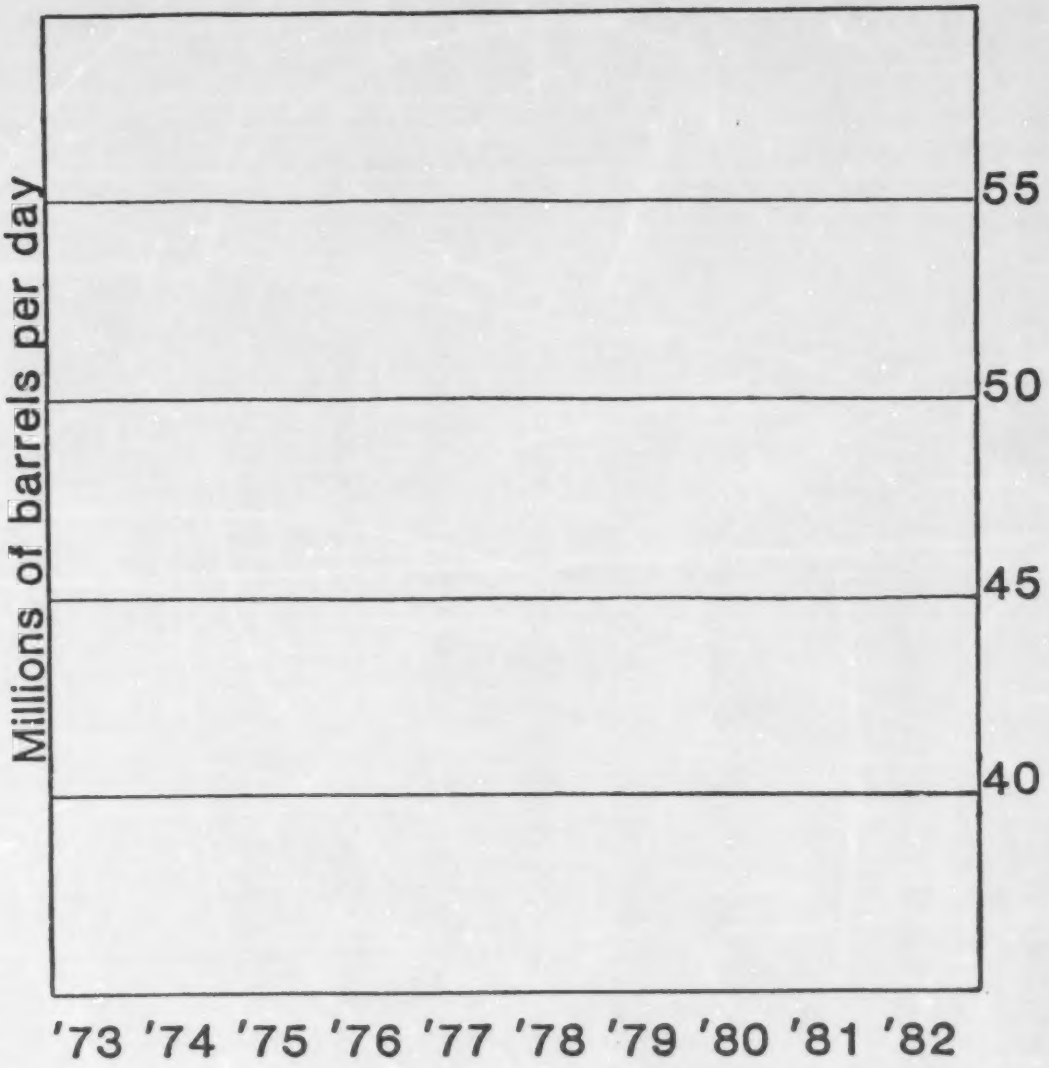
1. In what years was the trend in oil consumption increasing? Decreasing?

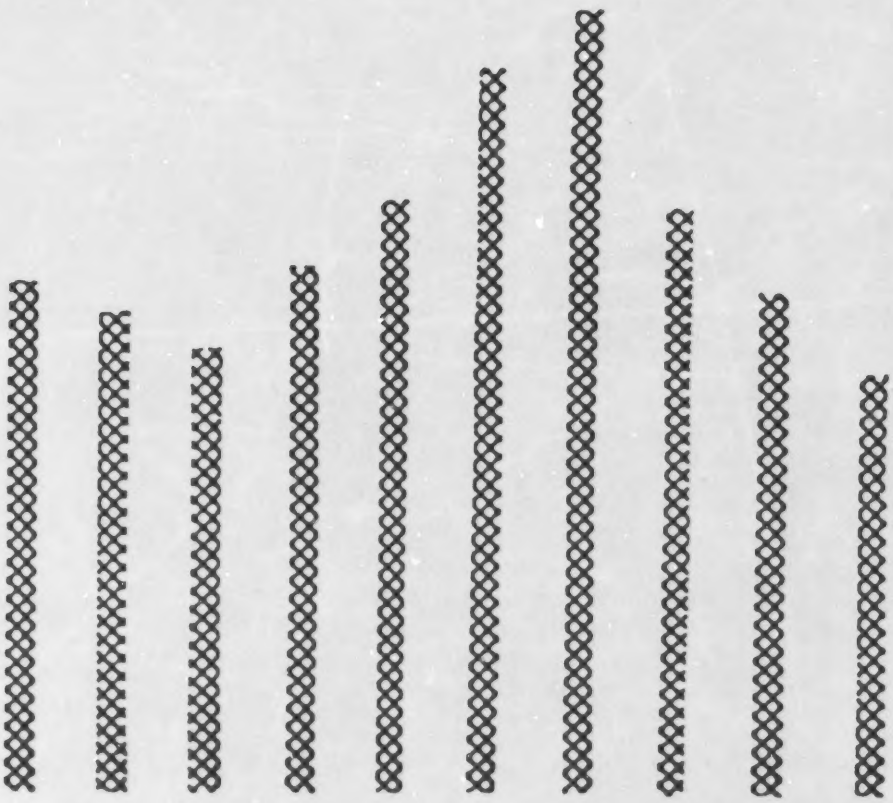
2. In what year was the most oil consumed? The least?

3. What two years had about the same consumption?

4. What is the percent of decrease in consumption from 1979-1982?

FREE WORLD OIL CONSUMPTION





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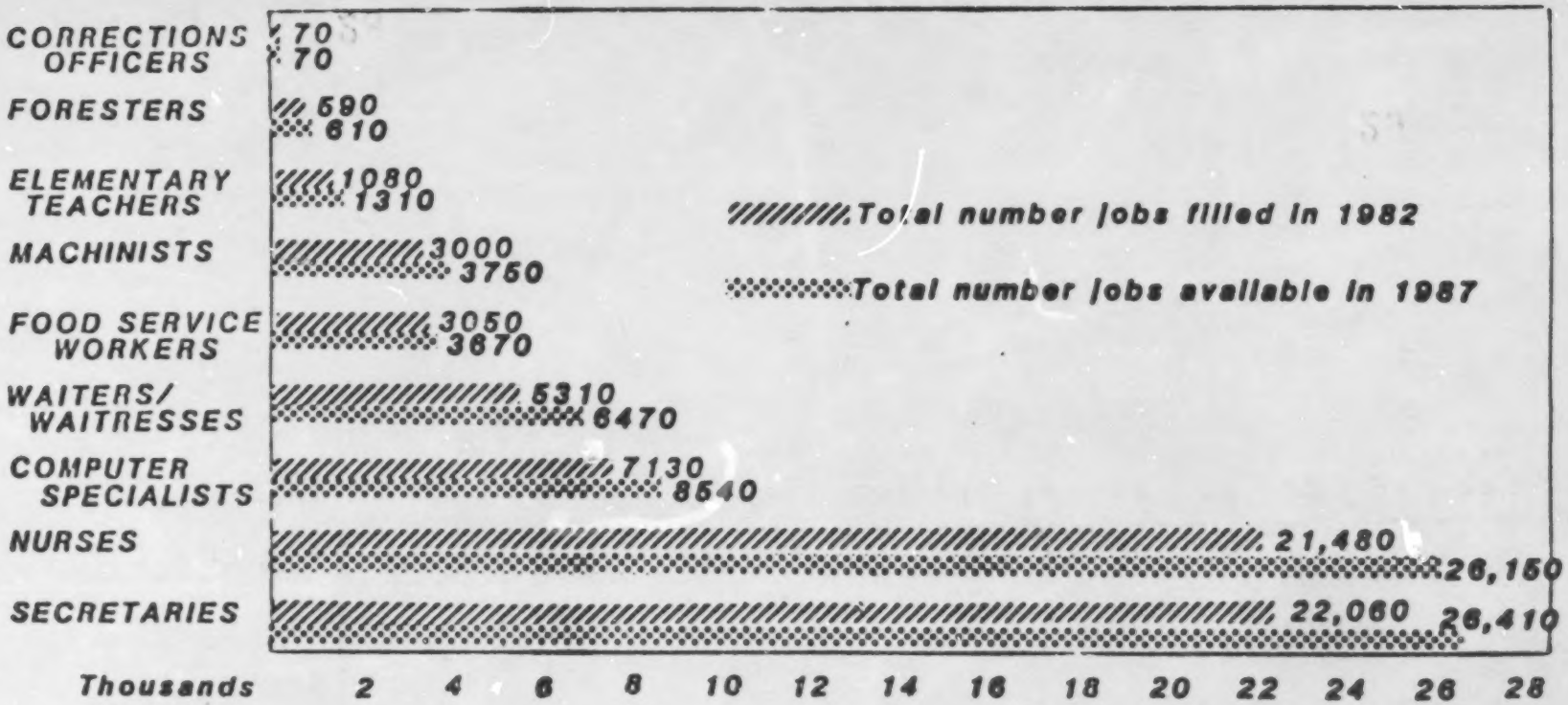
JOBS IN WASHINGTON STATE

COMPOSITE

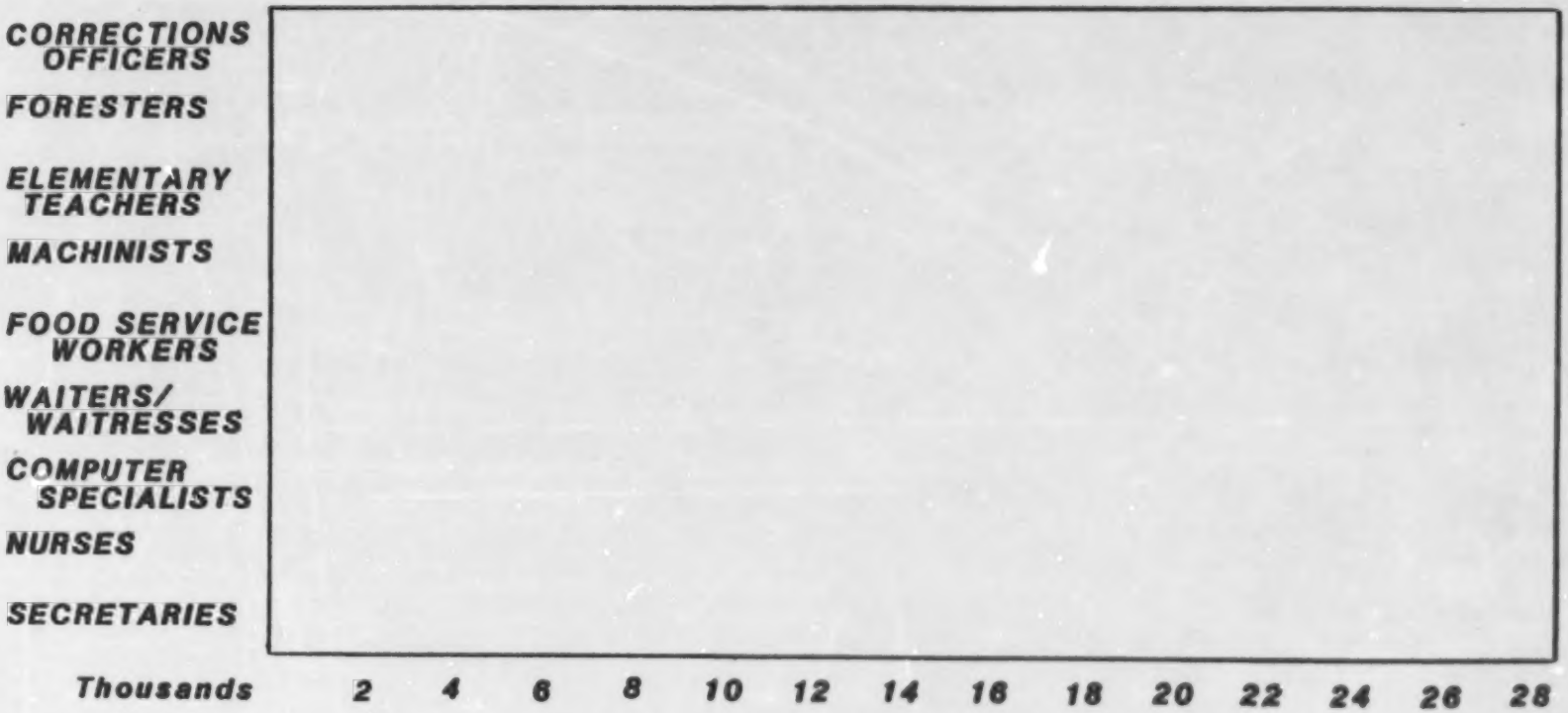


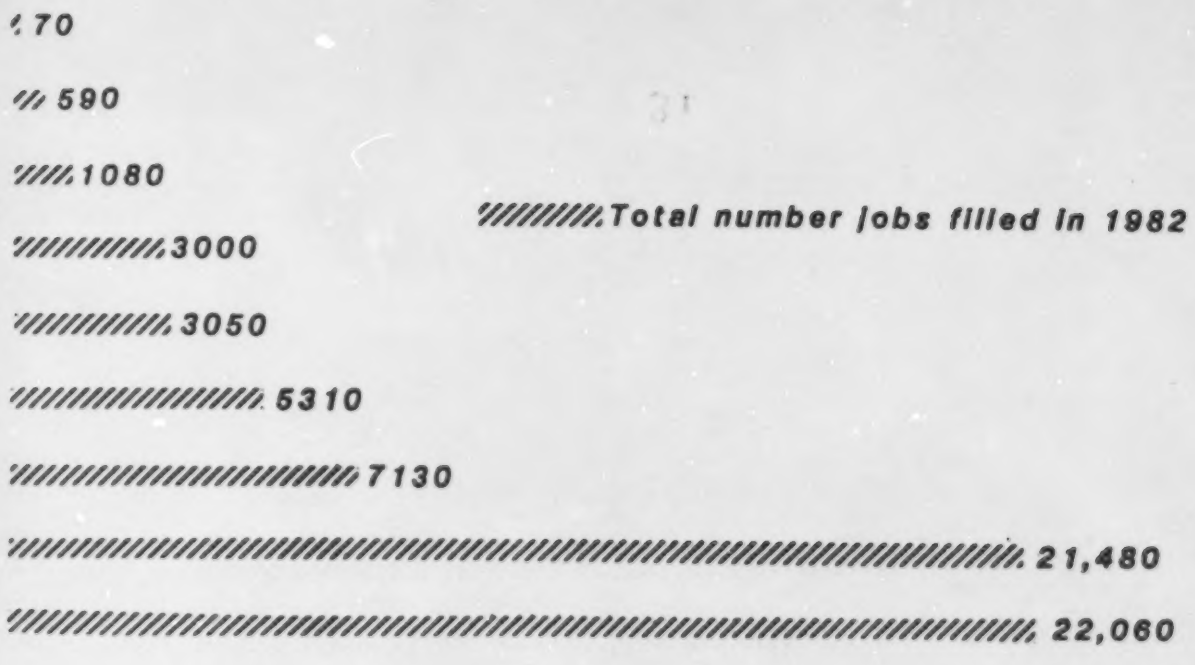
1. Which occupation area is expected to gain the largest number of new employees by 1987?

2. How many more computer specialist jobs should be available in1987 than in 1982?

3. Which three jobs show the highest percent of growth?

JOBS IN WASHINGTON STATE




70
590
1080
Total number jobs filled in 1982
3000
3050
5310
7130
21,480
22,060

70

610

1310

3750

3670

6470

8540

26,150

26,410

Total number jobs available in 1987

1. Which occupation area is expected to gain the largest number of new employees by 1987?

2. How many more computer specialist jobs should be available in1987 than in 1982?

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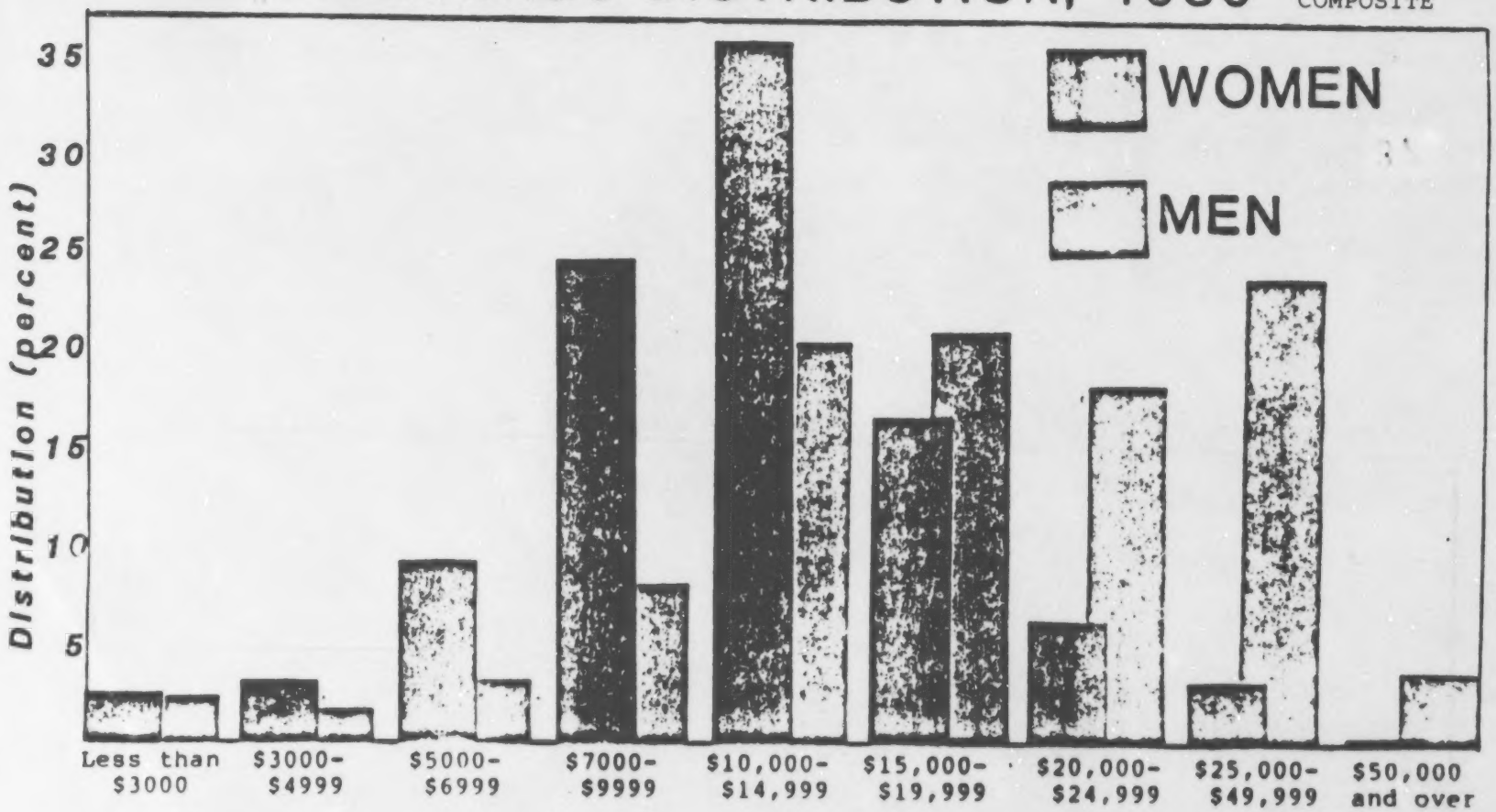
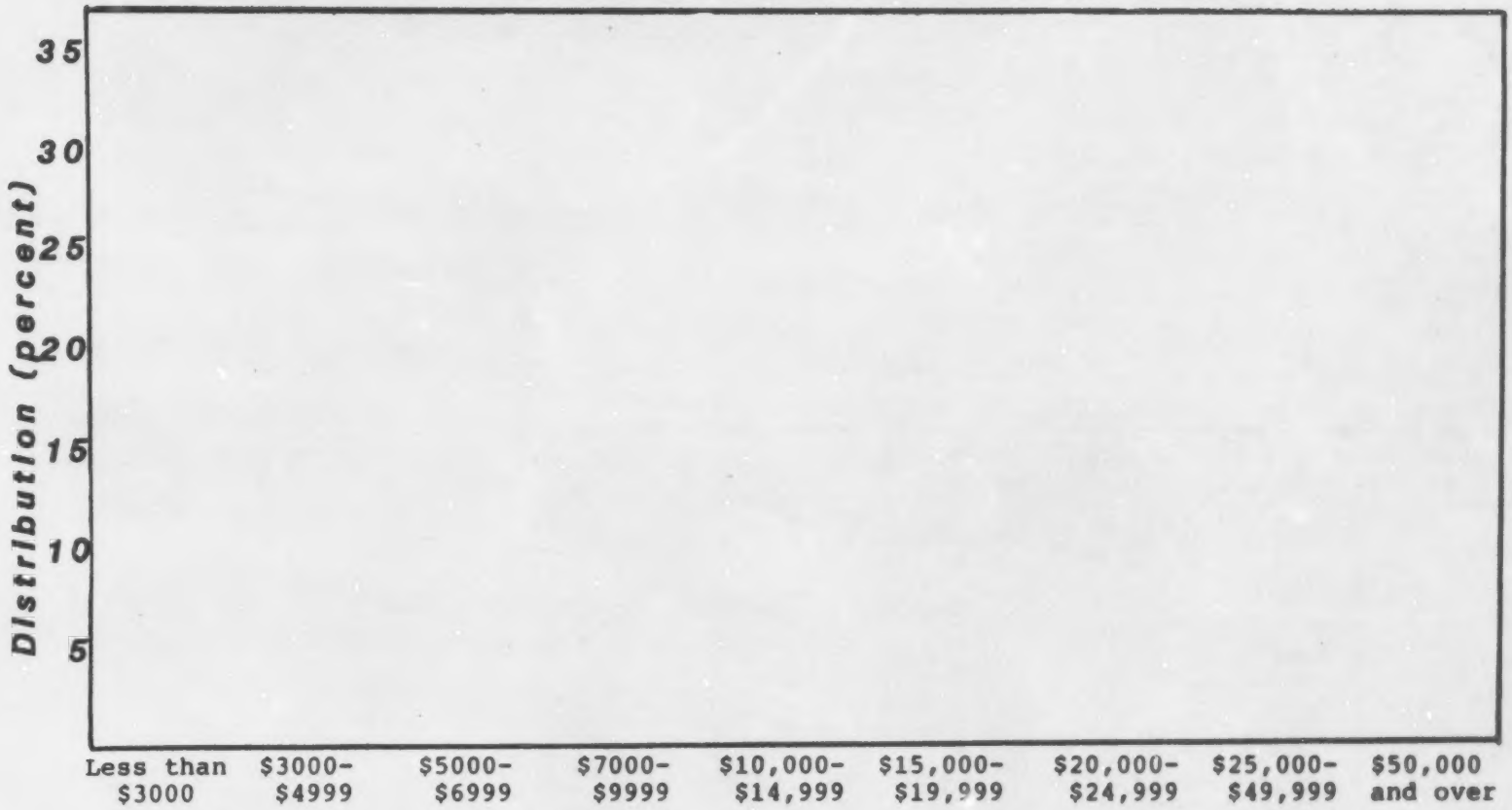
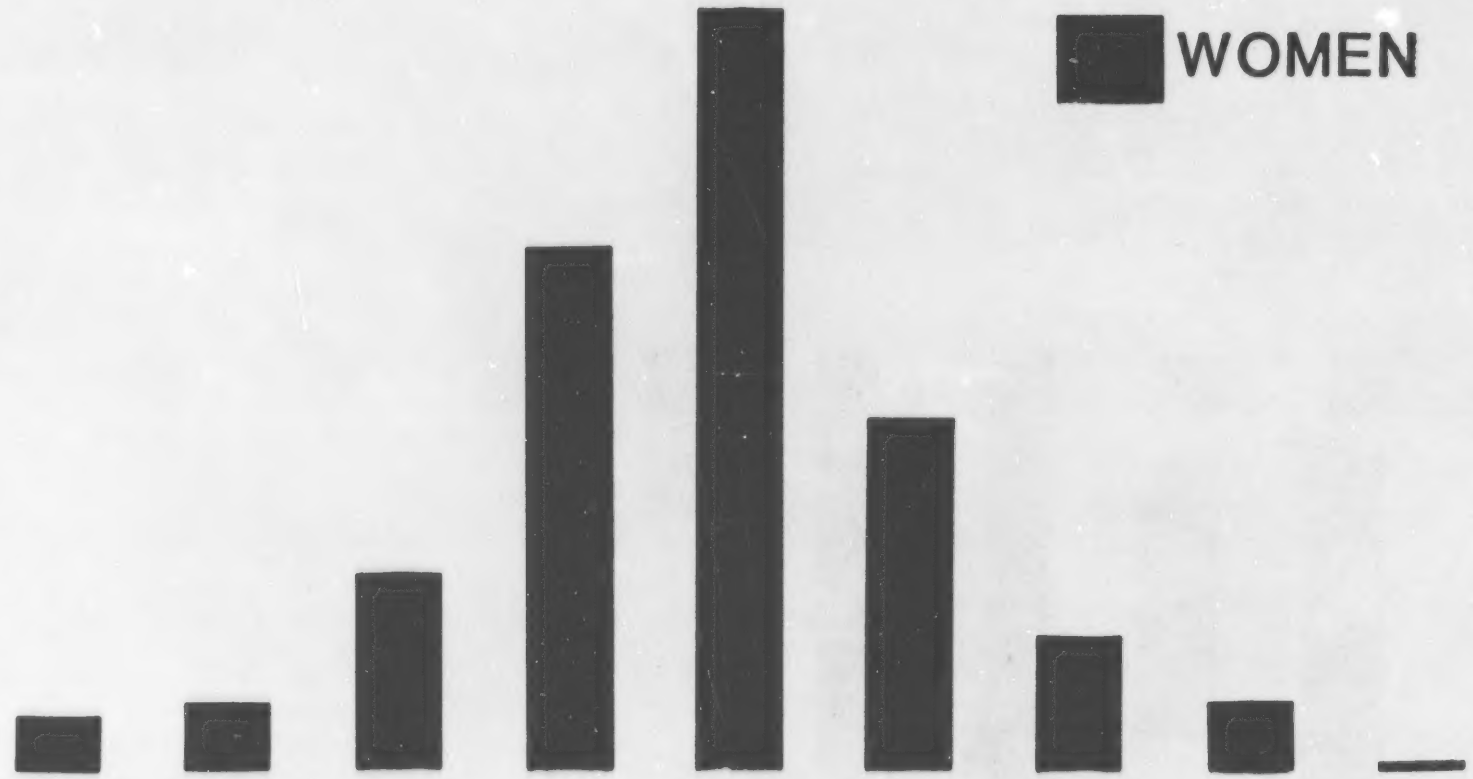
EARNINGS DISTRIBUTION, 1980 COMPOSITE

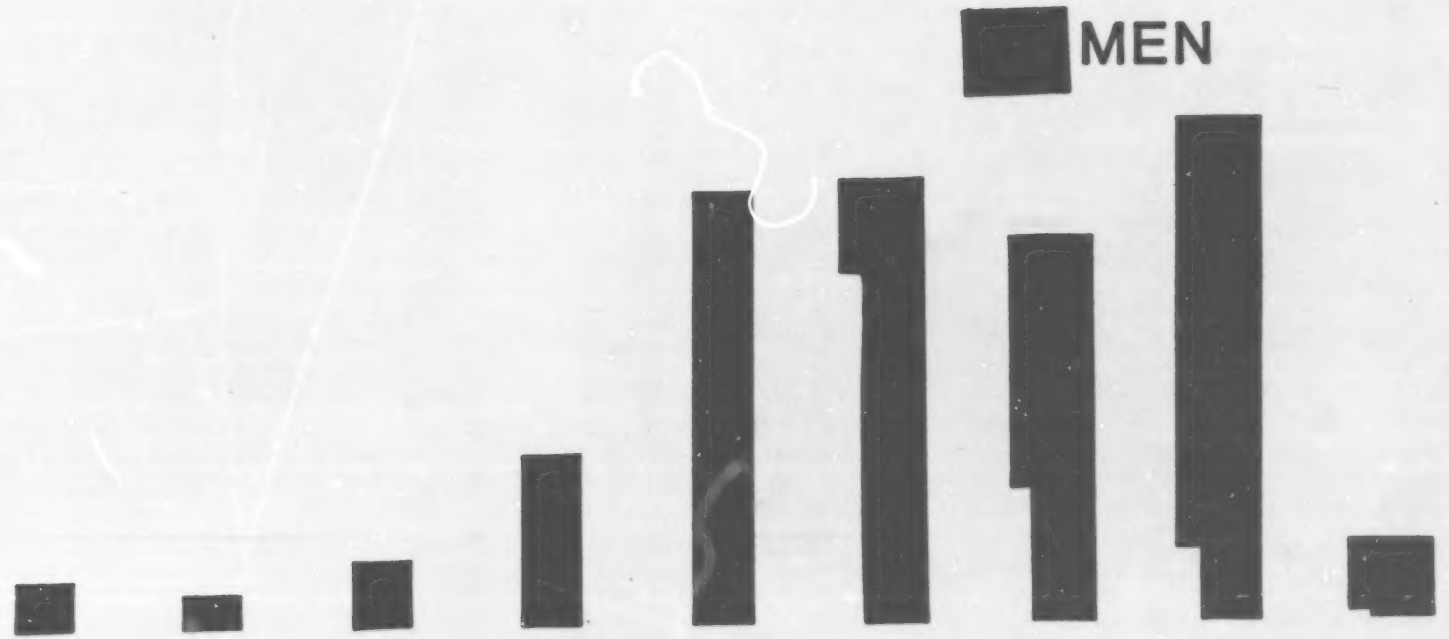


1. What total percent of women earn $14,999 or less?
2. What percent of men earn $20,000 or more annually?
3. The greatest percentage difference for female earnings is between which two categories?
4. Compare the percent of men earning under $10,000 to the percent of men earning over $25,000. Make the comparison for women.

EARNINGS DISTRIBUTION, 1980




WOMEN


MEN

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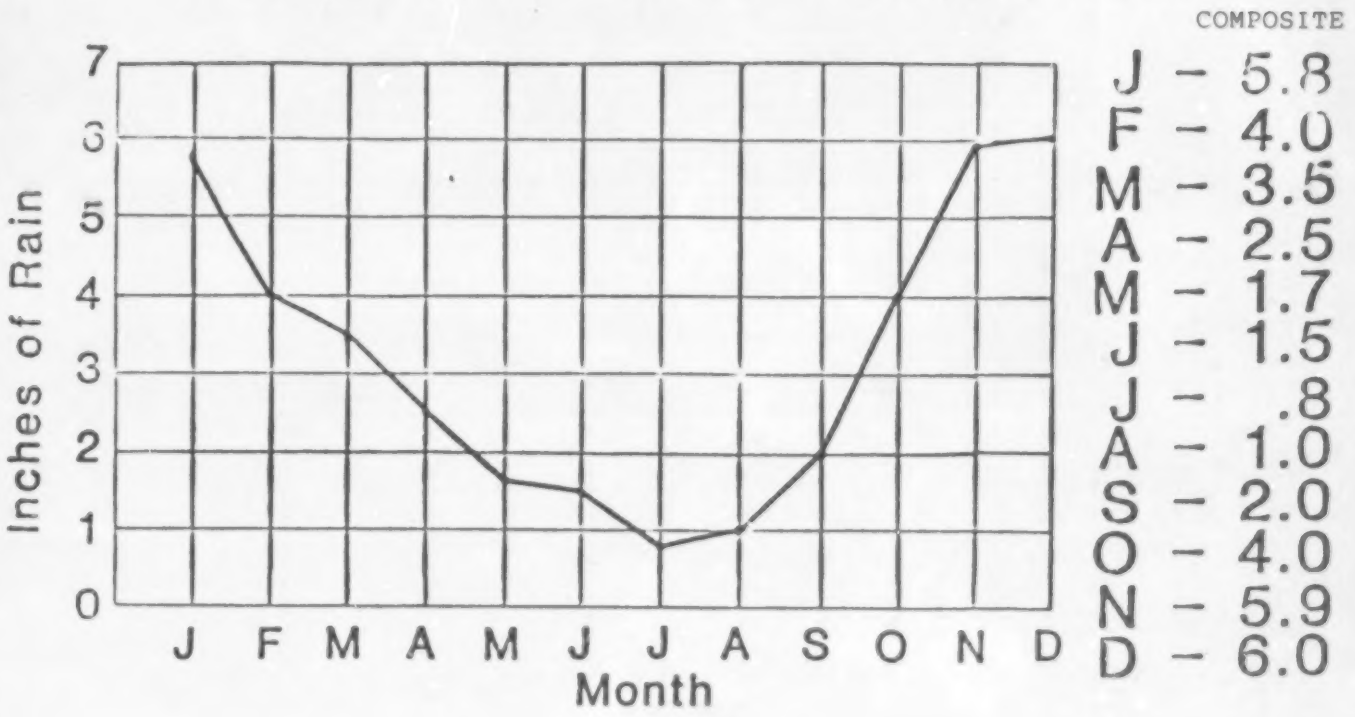
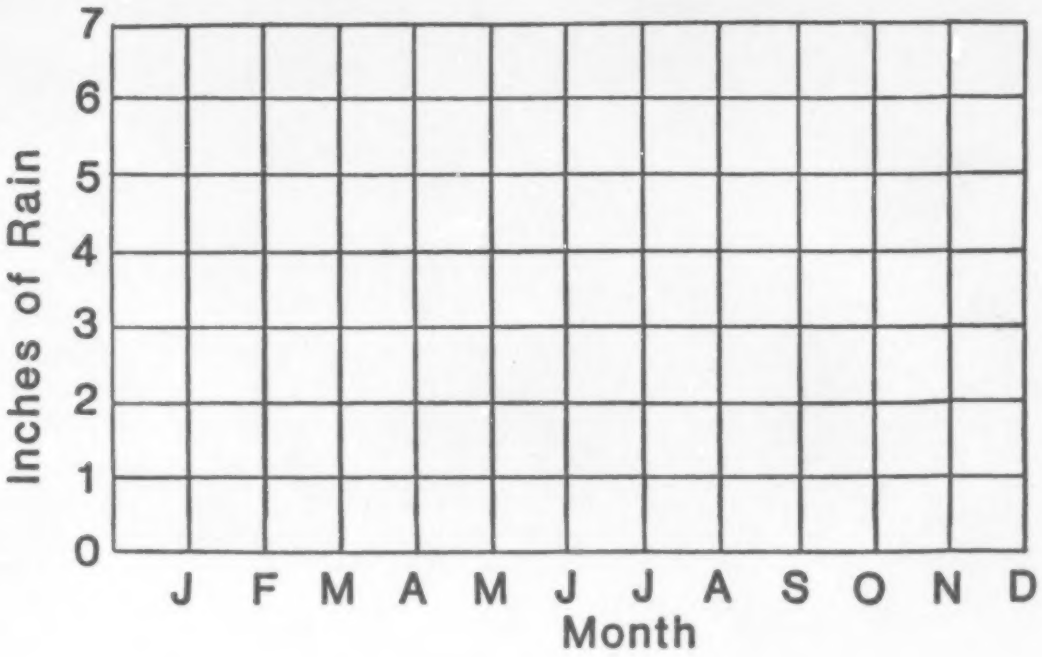
4. Compare the percent of men earning under $10,000 to the percent of men earning over $25,000. Make the comparison for women.

Average Monthly Rainfall – Seattle, Wash.



1. Which two months have the same average rainfall?
2. What is the total annual rainfall?
3. What is the average monthly rainfall?
4. The rainfall in March is about what percent of the annual rainfall?

Average Monthly Rainfall – Seattle, Wash.



1. Which two months have the same average rainfall?

2. What is the total annual rainfall?

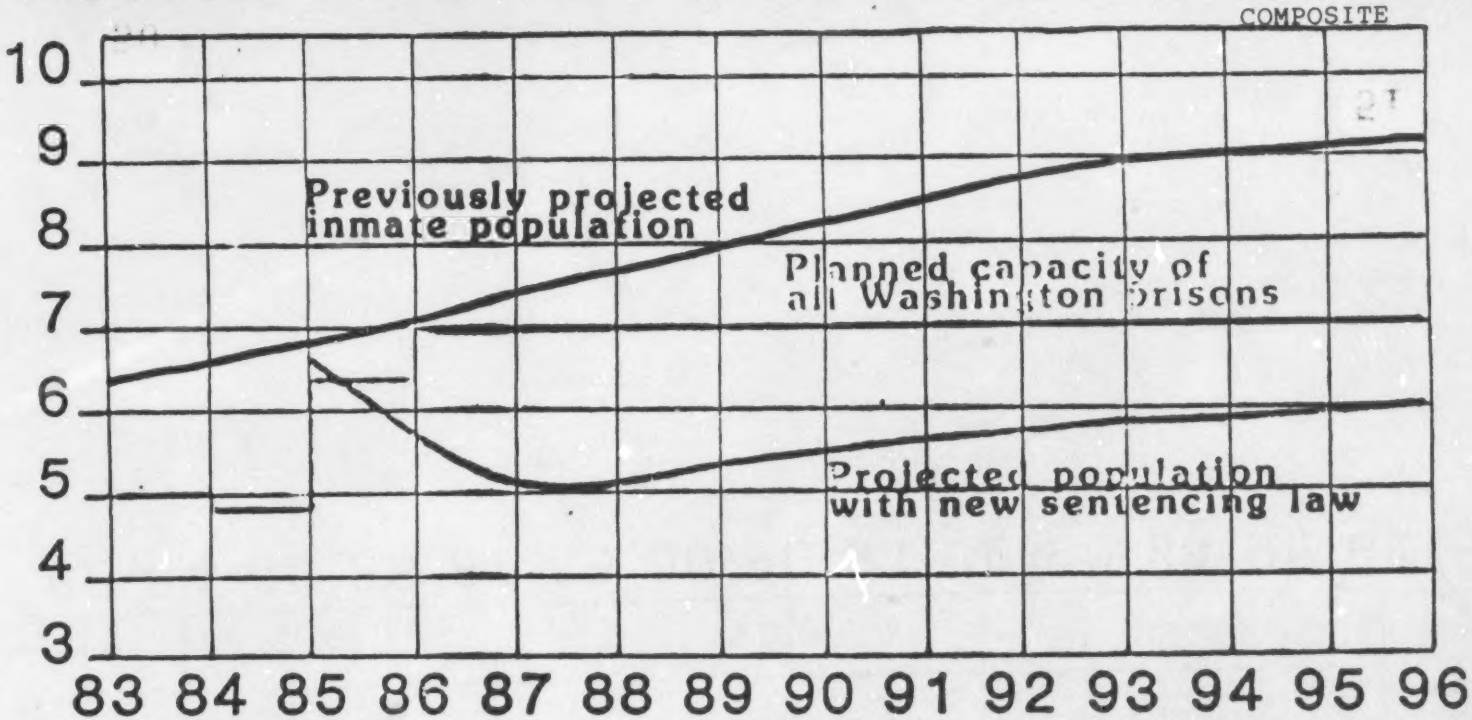
3. What is the average monthly rainfall?

4. The rainfall in March is about what percent of the annual rainfall?

J – 5.8
F – 4.0
M – 3.5
A – 2.5
M – 1.7
J – 1.5
J – .8
A – 1.0
S – 2.0
O – 4.0
N – 5.9
D – 6.0

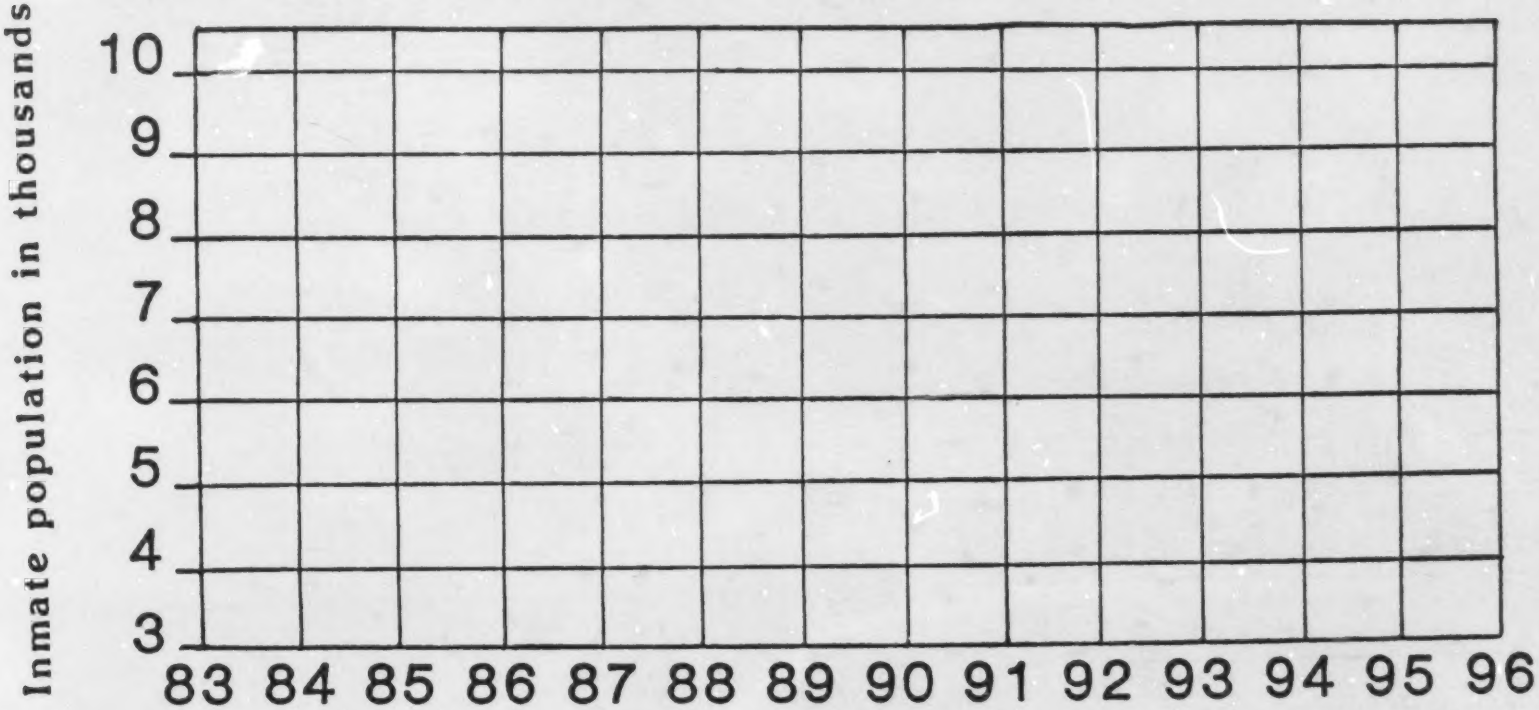
DO NOT FILM THIS LINE

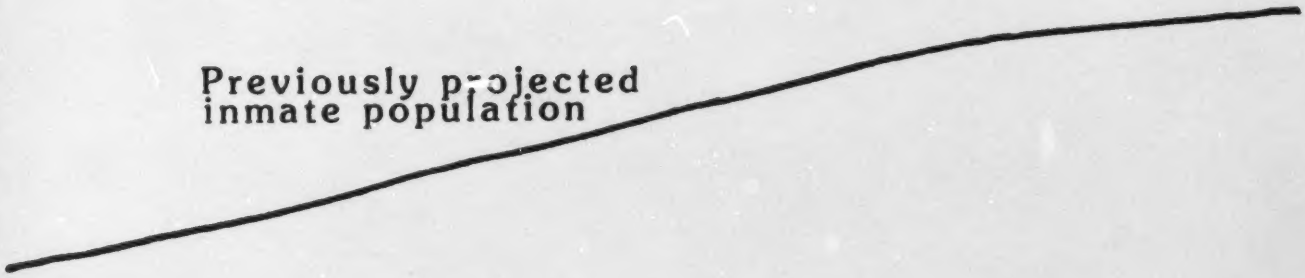
PRISON POPULATION GROWTH IN WASHINGTON

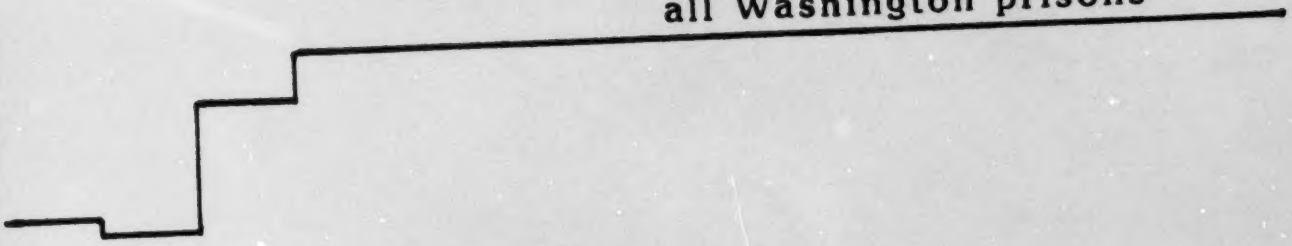


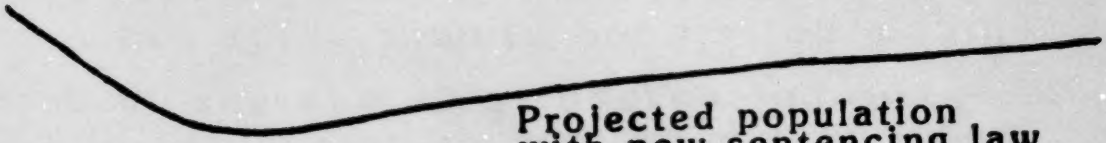
1. Is the trend in previously projected inmate population an increasing or decreasing one?
2. Previously projected inmate population would have had these prisons over the planned capacity by how many inmates in 1994?
3. New sentencing laws could have Washington's prison population under the planned capacity by how many in 1987-88?
4. By 1986, planned capacity in Washington prisons will have increased by what percent over the 1983 level?

PRISON POPULATION GROWTH IN WASHINGTON




Previously projected
inmate population


Planned capacity of
all Washington prisons


Projected population
with new sentencing law

1. Is the trend in previously projected inmate population an increasing or decreasing one?
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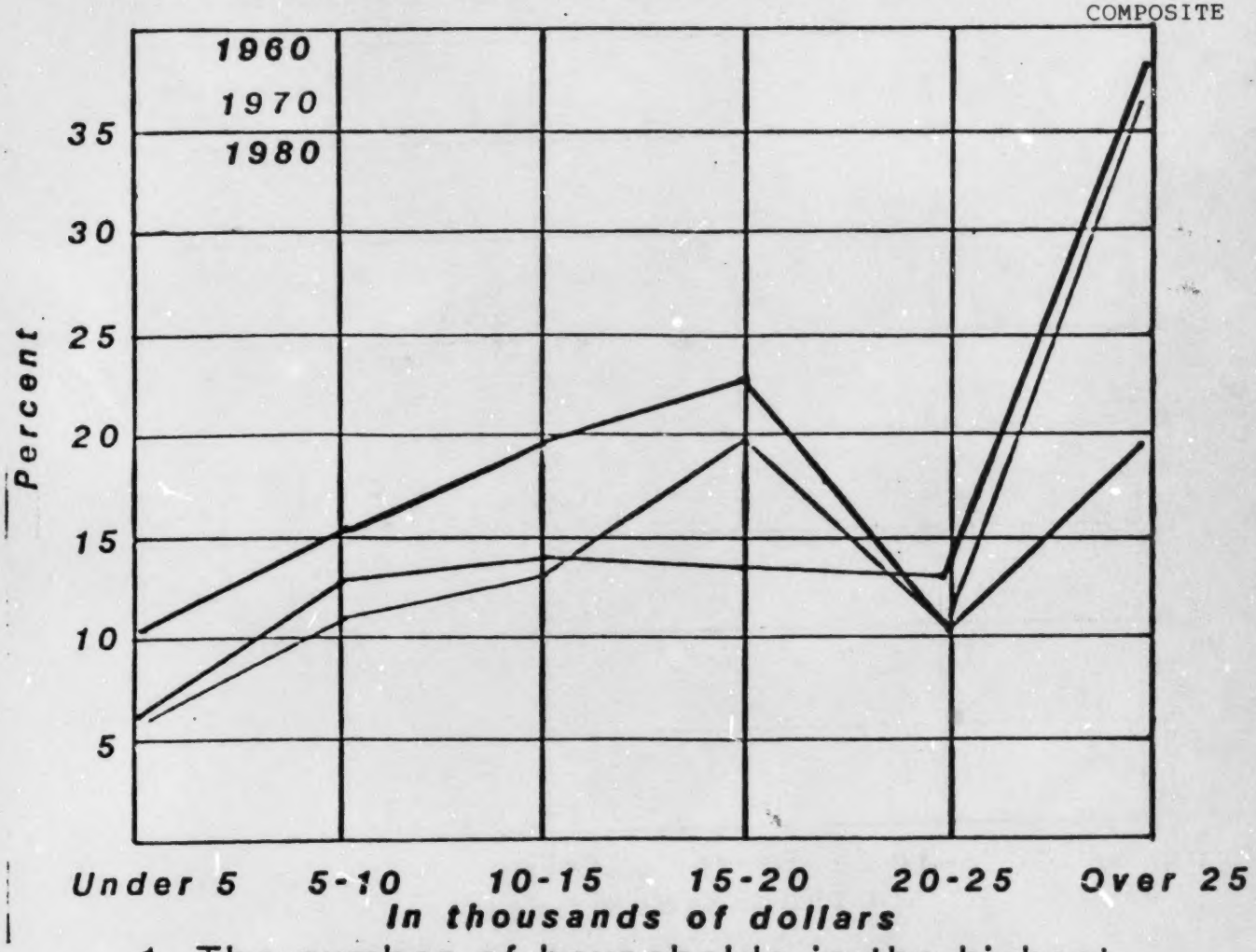
HOUSEHOLD INCOME 1960-1980

COMPOSITE



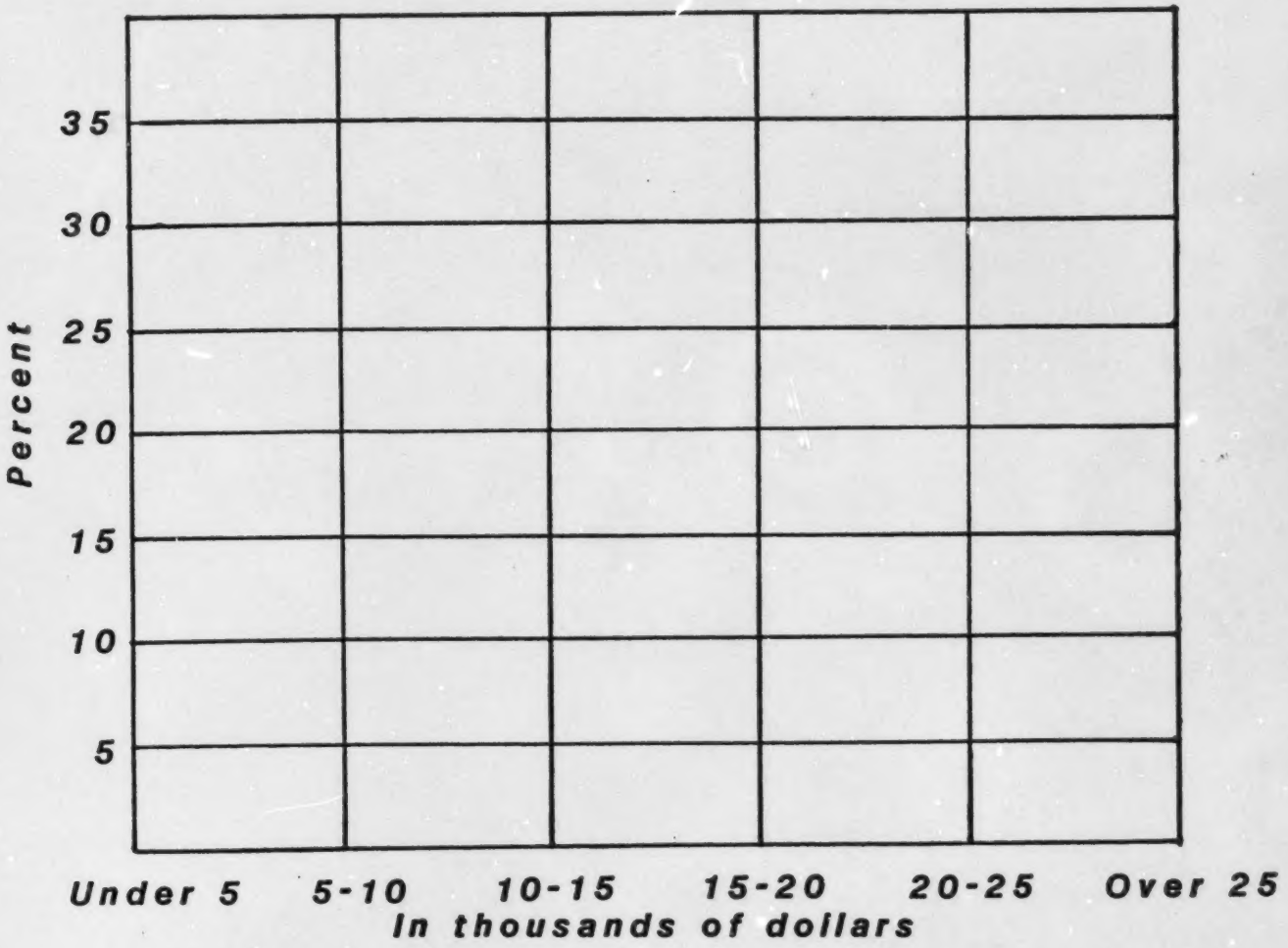
1. The number of households in the highest income category increased by what percent from 1960 to 1980?

2. Families earning $10,000 or under decreased by what percent from 1960 to 1980?

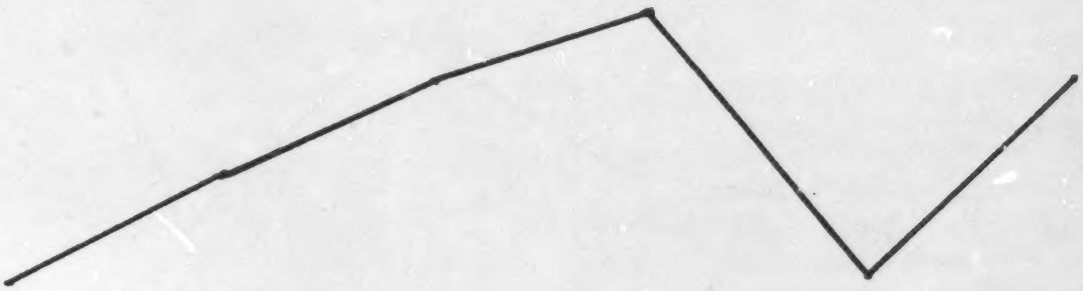
3. The greatest percent of change occurred between which two categories in 1970?

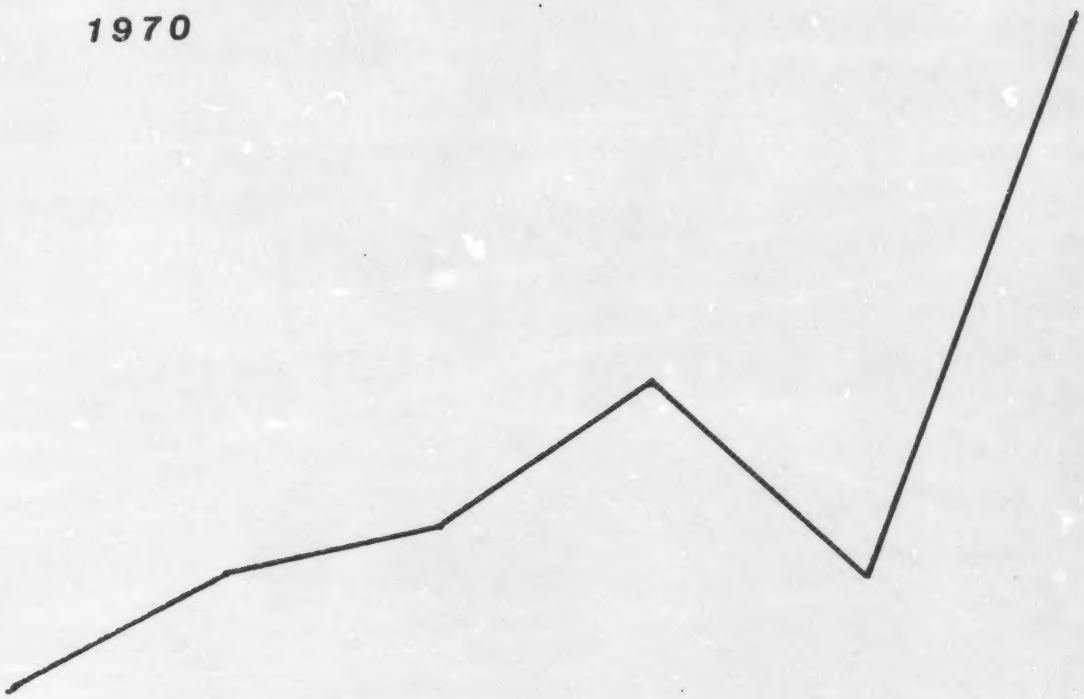
4. Compare the dollar income of the most households in 1960 to the most households in 1980.

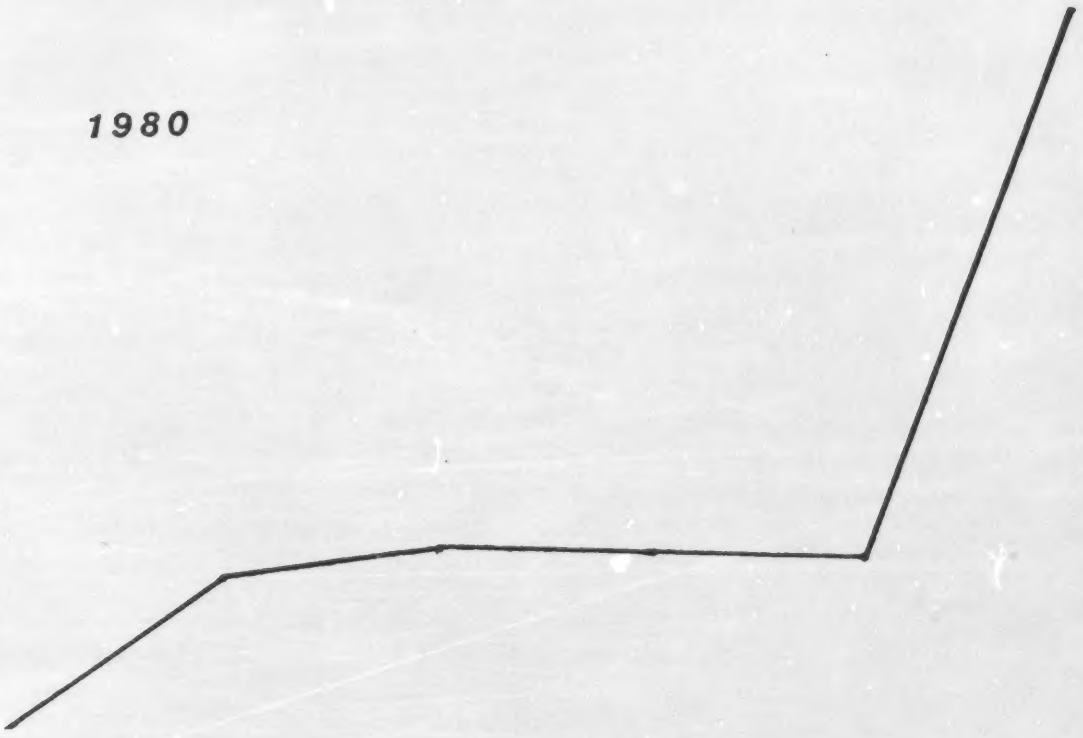
HOUSEHOLD INCOME 1960-1980



1960




1970


1980

1. The number of households in the highest income category increased by what percent from 1960 to 1980?

2. Families earning $10,000 or under decreased by what percent from 1960 to 1980?

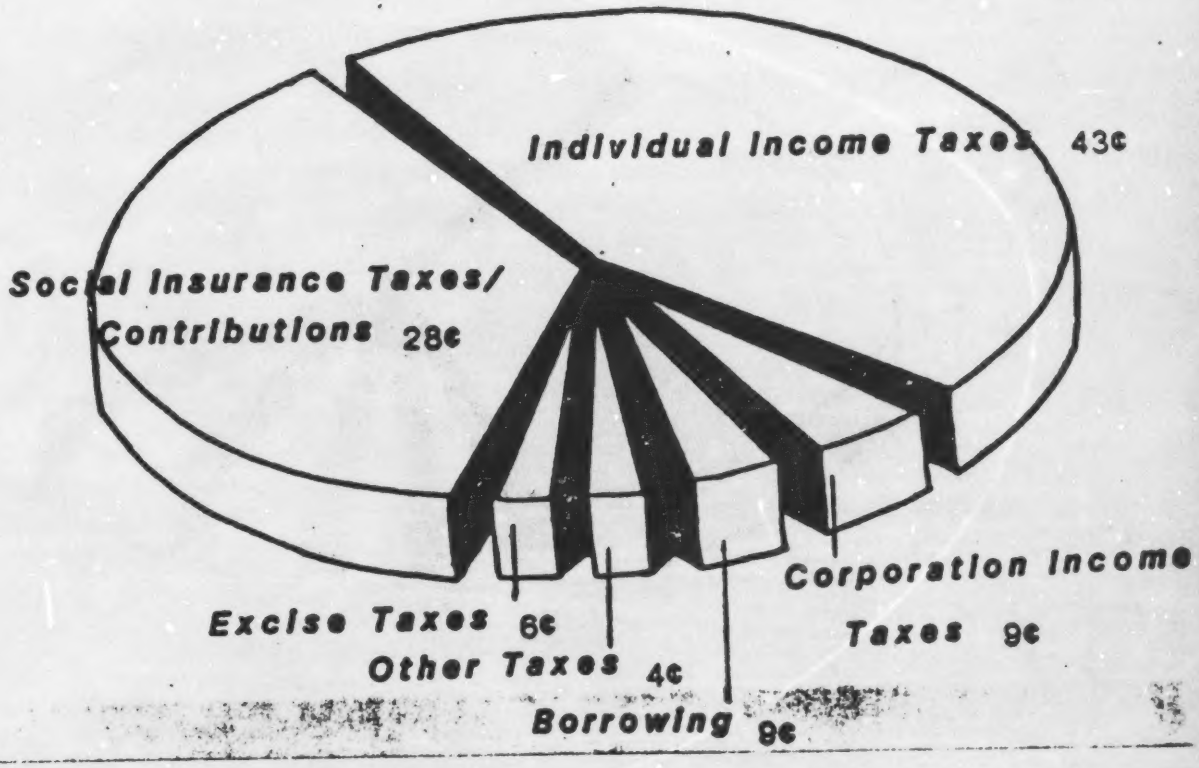
3. The greatest percent of change occurred between which two categories in 1970?

4. Compare the dollar income of the most households in 1960 to the most households in 1980.

COMPOSITE

GOVERNMENT DOLLARS

Where they come from



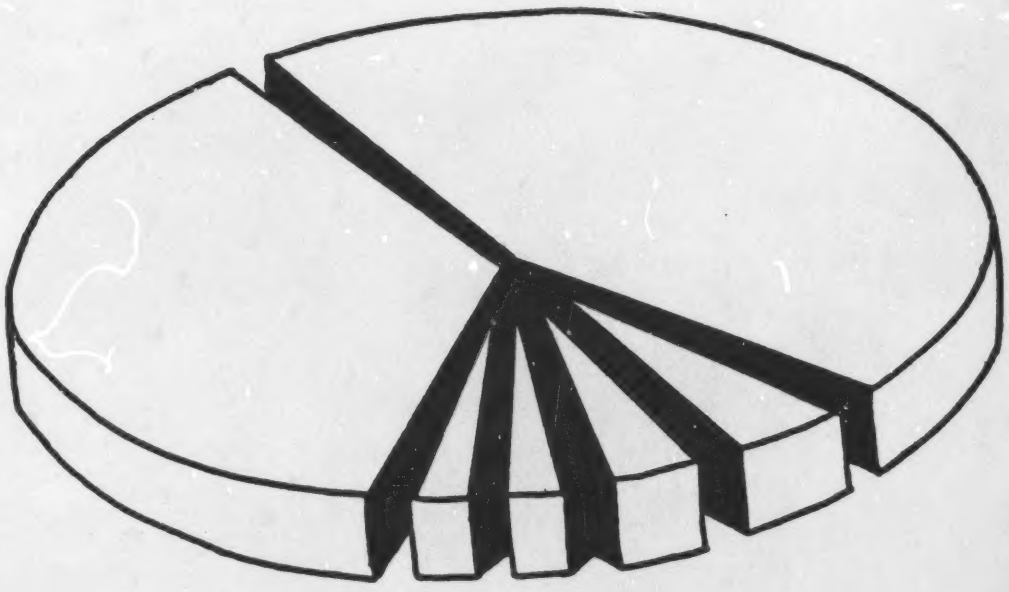
1. The largest portion of government dollars comes from which group?

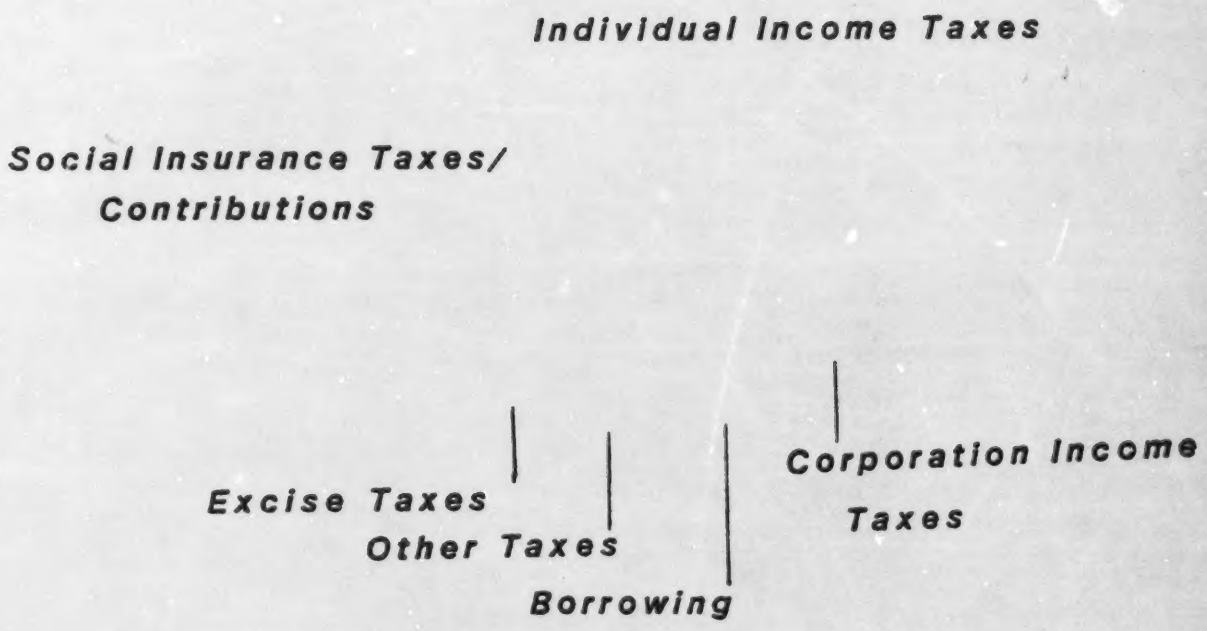
2. What percent of government receipts come from excise and other taxes?

3. If the government received $602.6 billion last year, how much came from Social Security, other insurance and retirement taxes and contributions?

GOVERNMENT DOLLARS

Where they come from




Individual Income Taxes
Social Insurance Taxes/
Contributions
Excise Taxes
Other Taxes
Borrowing
Corporation Income
Taxes

43¢

28¢

6¢

9¢

4¢

9¢

3

1. The largest portion of government dollars comes from which group?

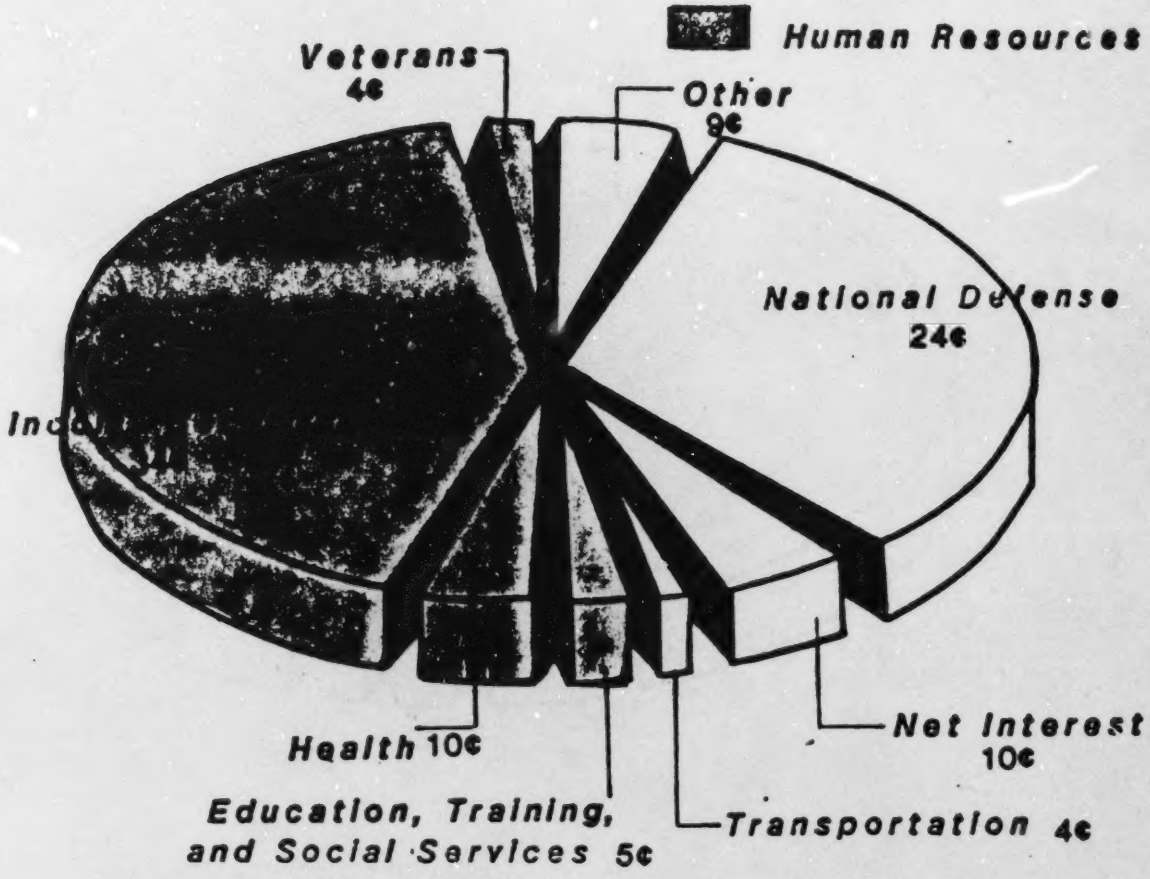
2. What percent of government receipts come from excise and other taxes?

3. If the government received $602.6 billion last year, how much came from Social Security, other insurance and retirement taxes and contributions?

GOVERNMENT DOLLARS

COMPOSITE

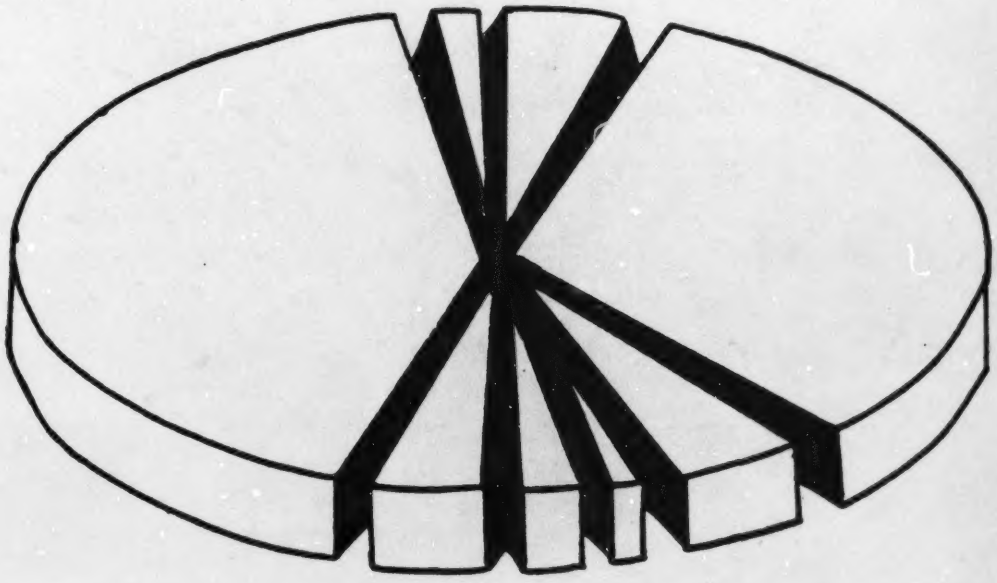
Where they go

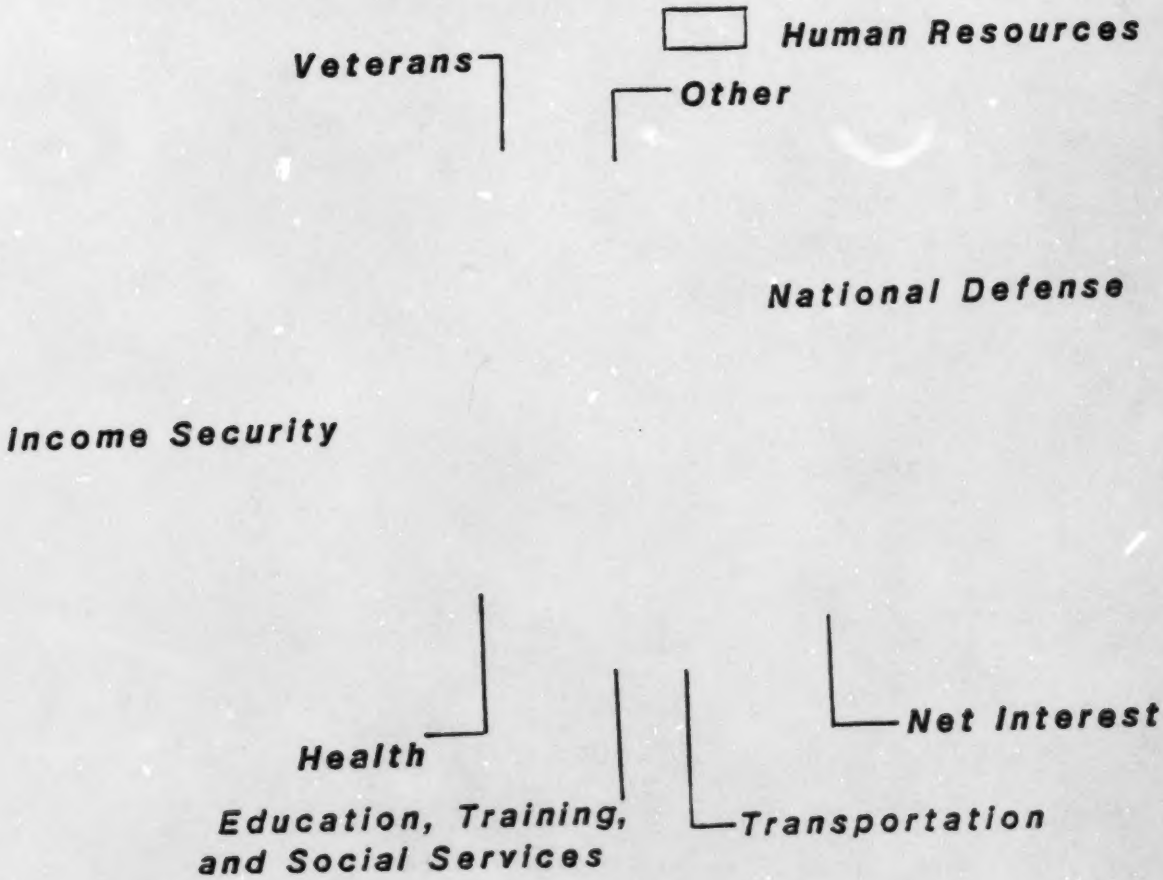


1. What percent of government dollars are used to support human resources?
2. If the government spent $660.5 billion last year, how many dollars were spent on defense?
3. On what two areas was the least money spent?
4. If the government received $602.6 billion and spent $660.5 billion, what was the amount of deficit?

GOVERNMENT DOLLARS

Where they go




Human Resources
Veterans
Other
National Defense
Income Security
Net Interest
Health
Education, Training,
and Social Services
Transportation

4¢

9¢

24¢

34¢

10¢

10¢

4¢

5¢

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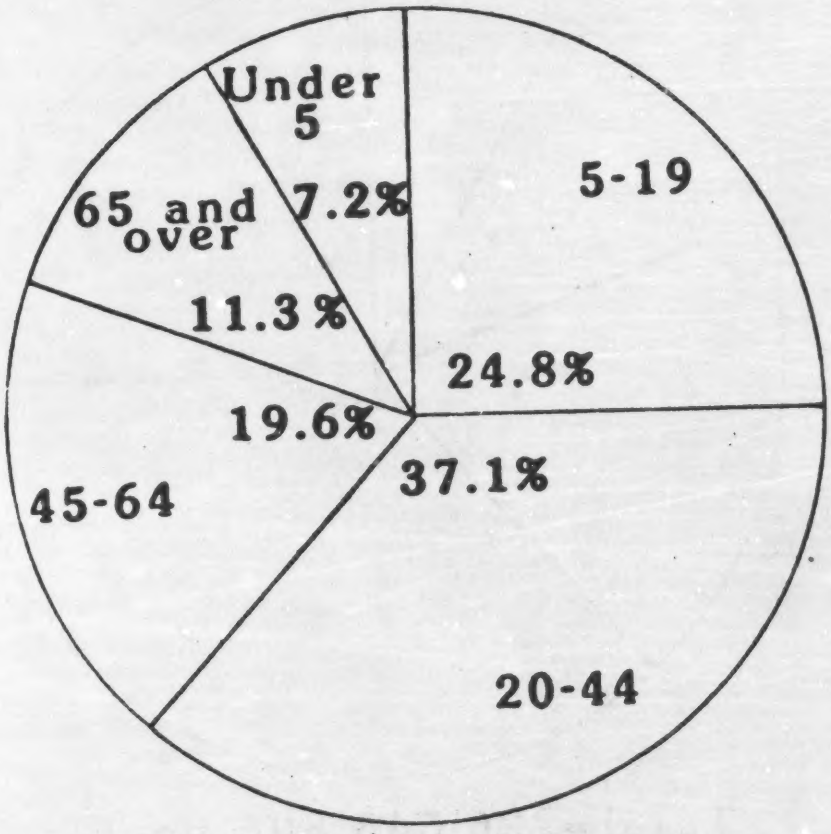
4. If the government received $602.6 billion and spent $660.5 billion, what was the amount of deficit?

POPULATION DISTRIBUTION BY AGE

1980

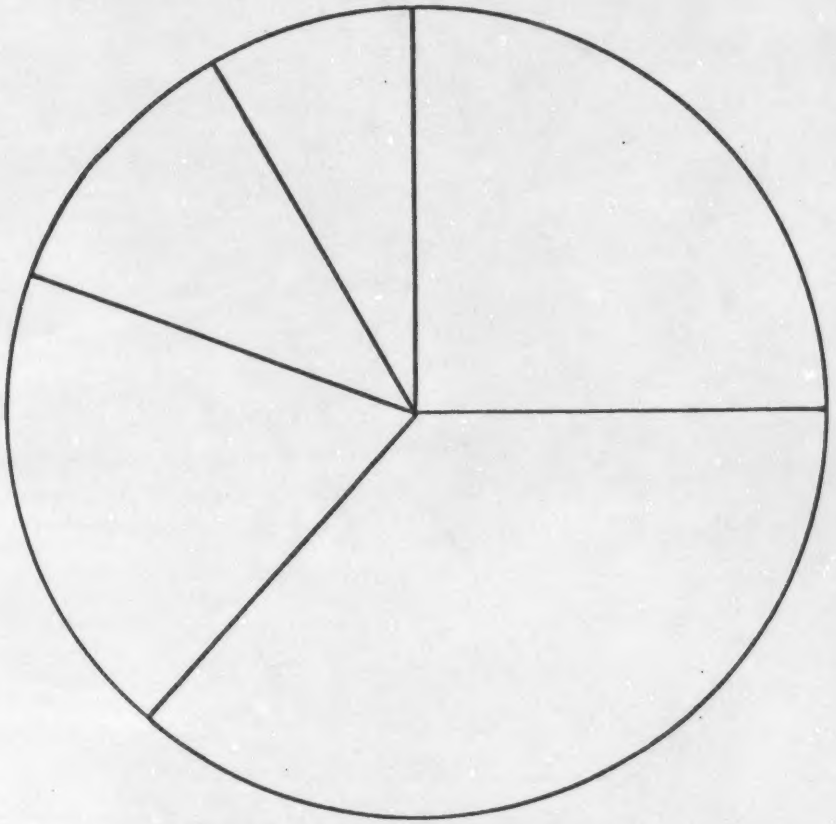
COMPOSITE



Total=226,545,805 people

1. What percent of the population is 19 years of age or under? 45 or over?
2. About how many people are between the ages of 20 and 44?
3. The number of people between 20-44 is larger than the number of people under 5 by about how many times?
4. The largest increase in percent of the population occurs between which age categories?

POPULATION DISTRIBUTION BY AGE
1980



Total=226,545,805 people

Under 5

5-19

65 and over

45-64

20-44

7.2%

11.3%

24.8%

19.6%

37.1%

1. What percent of the population is 19 years of age or under? 45 or over?
2. About how many people are between the ages of 20 and 44?
3. The number of people between 20-44 is larger than the number of people under 5 by about how many times?
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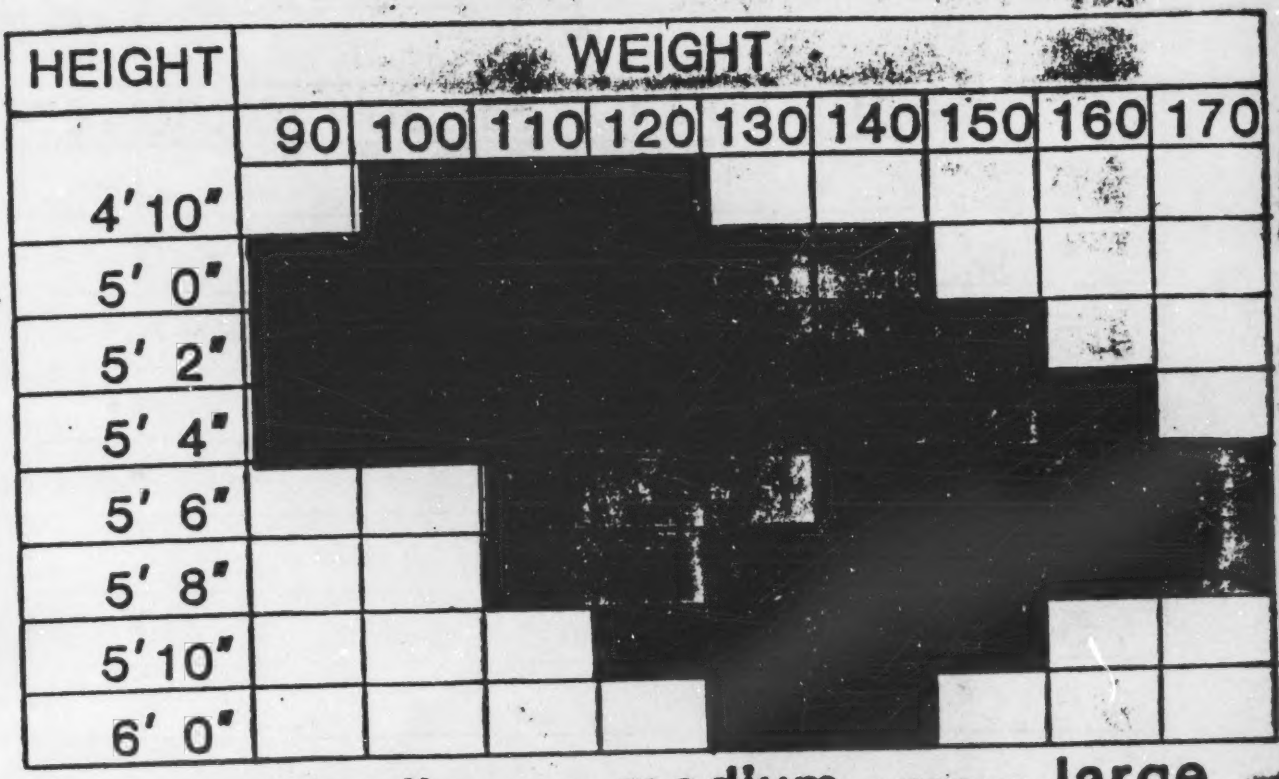
WOMEN'S SWEAT PANTS

Size Chart

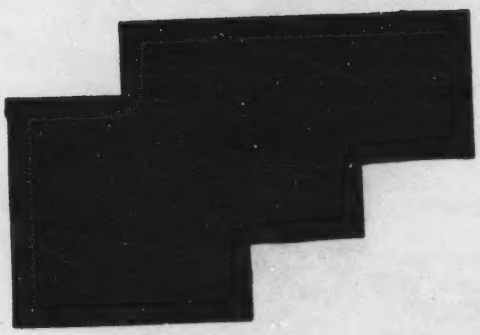
COMPOSITE



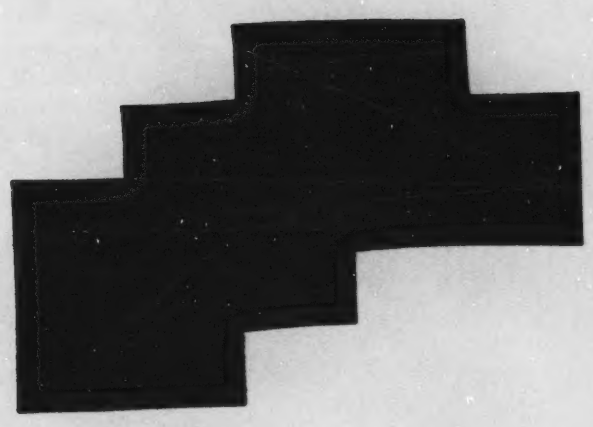
1. If you are 5'2" tall and weigh 135 pounds, what size sweat pants should you buy?
2. If you are 5'4" and weigh 120 pounds, how many pounds can you gain and still wear the same size?
3. If you are 5'7" and weigh 125 pounds, what size sweat pants should you buy?
4. Without considering weight, what are the heights of the shortest and tallest women who might wear a size large?

WOMEN'S SWEAT PANTS
Size Chart

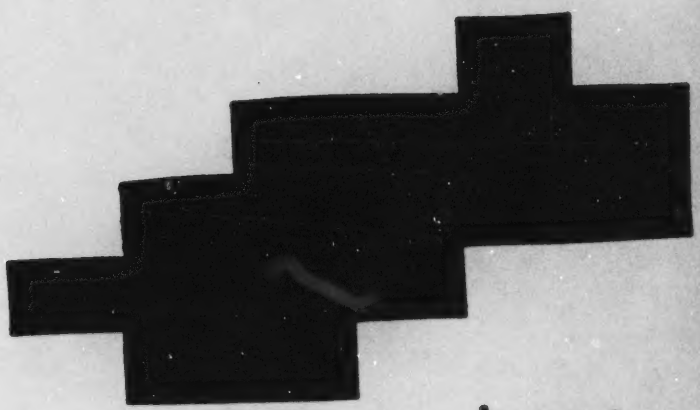
HEIGHT	WEIGHT								
	90	100	110	120	130	140	150	160	170
4'10"									
5' 0"									
5' 2"									
5' 4"									
5' 6"									
5' 8"									
5'10"									
6' 0"									



small



medium



large

1. If you are 5'2" tall and weigh 135 pounds, what size sweat pants should you buy?
2. If you are 5'4" and weigh 120 pounds, how many pounds can you gain and still wear the same size?
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COMPARISON OF MICROCOMPUTER SYSTEMS

COMPOSITE

	Hazlit/9	735R	Champ	Camsoft	89-02	New Age
Processor	6502	Z80	6502	Z80	8080	Z80
Memory Min/Max	8/32	4/48	16/64	8/32	8/48	16/48
Lower Case	Y	Y	NI	Y	Y	NI
Display	Y	Y	NI	NI	Y	Y
Cassette or Disk	C/MD*	C/MD	C*/MD*	C*	MD	C*/MD*
Text (Lines x Char)	24x40	16x32	24x40	30x64	32x84	24x32
Multiple Languages		Y	Y	Y		Y
Software	Y	Y	Y	Some	Unk	Y
Special Features	4/15 Colors		8 Colors	16 Colors		
Cost	$795	$698	$1195	$895	$1495	$1150

NI-Not Included UNK-Unknown OPT-Optional item not usually from manufacturer

MD-Mini Disk *Extra Cost

Y-Yes

1. Which computers have the cassette included?
2. Which computers have at least 28 lines of text?
3. If you need to use lower case letters, which computers would not be good choices?
4. If you need a computer with mini disk, display, and multiple languages for under $1000, which should you choose?

COMPARISON OF MICROCOMPUTER SYSTEMS

	Hazlit/9	735R	Champ	Camsoft	89-02	New Age
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*Extra Cost

OPT-Optional item not usually from manufacturer

6502	Z80	6502	Z80	8080	Z80
8/32	4/48	16/64	8/32	8/48	16/48
Y	Y	NI	Y	Y	NI
Y	Y	NI	NI	Y	Y
C/MD*	C/MD	C*/MD*	C*	MD	C*/MD*
24x40	16x32	24x40	30x64	32x84	24x32
	Y	Y	Y		Y
Y	Y	Y	Some	Unk	Y
4/15 Colors		8 Colors	16 Colors		
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BUDGET DEFICITS

COMPOSITE

PRESIDENT	YEAR	DEFICIT
Roosevelt	1934	$ 3.6
	1935	2.8
	1936	4.4
	1937	2.8
	1938	1.2
	1939	3.9
	1940	3.1
	1941	5.0
	1942	20.8
	1943	54.9
	1944	47.0
	1945	47.5
Truman	1946	15.9
	1947	3.9
	1948	12.0
	1949	0.6
	1950	3.1
	1951	6.1
	1952	1.5
	1953	6.5
Eisenhower	1954	1.2
	1955	3.0
	1956	4.1
	1957	3.2
	1958	2.9
Eisenhower	1959	$12.9
	1960	0.3
	1961	3.4
Kennedy	1962	7.1
	1963	4.8
Johnson	1964	5.9
	1965	1.6
	1966	3.8
	1967	8.7
	1968	25.2
	1969	3.2
Nixon	1970	2.8
	1971	23.0
	1972	23.4
	1973	14.8
	1974	4.7
Ford	1975	45.2
	1976	79.4
Carter	1977	44.9
	1978	48.8
	1979	27.7
	1980	59.6
Reagan	1981	57.9
	1982	110.7
	1983	208.0

Years end June 30 through 1976, September 30 thereafter.

President in office for majority of a budget year is listed.

Federal budget surplus (in billions) Federal budget deficit (in billions)

1. *The largest annual deficits occurred during the administrations of which two Presidents?*
2. *Which President had the lowest total deficit for his administration? The highest?*
3. *Reagan's total deficit is about how many times greater than Carter's total deficit?*

BUDGET DEFICITS

PRESIDENT	YEAR	DEFICIT

PRESIDENT	YEAR	DEFICIT

Years end June 30 through 1976, September 30 thereafter.
President in office for majority of a budget year is listed.

Roosevelt	1934	$ 3.6
	1935	2.8
	1936	4.4
	1937	2.8
	1938	1.2
	1939	3.9
	1940	3.1
	1941	5.0
	1942	20.8
	1943	54.9
	1944	47.0
	1945	47.5
Truman	1946	15.9
	1947	
	1948	
	1949	
	1950	3.1
	1951	
	1952	1.5
	1953	6.5
Eisenhower	1954	1.2
	1955	3.0
	1956	
	1957	
	1958	2.9
Eisenhower	1959	$12.9
	1960	
	1961	3.4
Kennedy	1962	7.1
	1963	4.8
Johnson	1964	5.9
	1965	1.6
	1966	3.8
	1967	8.7
	1968	25.2
	1969	
Nixon	1970	2.8
	1971	23.0
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	1979	27.7
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	1982	110.7
	1983	208.0

Federal budget deficit (in billions)

0.3

3.2

3.9
12.0
0.6

6.1

4.1
3.2

Federal budget surplus (in billions)

1. The largest annual deficits occurred during the administrations of which two Presidents?
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3. Reagan's total deficit is about how many times greater than Carter's total deficit?